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## BULBAR POLIOMYELITIS

### Favorable Results in Its Treatment as a Problem in Respiratory Obstruction


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In bulbar poliomyelitis it has usually been assumed that the grave effects were due to the direct action of the virus itself on the central nervous system. In 1943, one of us (T. C. G.) [1] presented the idea that secretional obstruction and anoxia were much more important. During the ensuing time that conviction has grown. In the past two years we have been able to key our treatment to that concept.

With such treatment in the past two and one-half years at the Evanston Hospital, we have had no deaths in 15 cases of bulbar poliomyelitis. The mortality rate for the bulbar form of the disease was 38.8 per cent in Illinois outside of Chicago during 1947 and 1948.[2] The mortality rate among residents of Chicago was 27 per cent in 1948, for which figures are available [3] (table). Our favorable results in the same region during the same time could hardly be explained by chance or variation in the disease. Six of the 15 patients in our series were desperately ill and would, we believe, have died without tracheotomy and other special measures.

We have added nothing essentially new to our method of treatment since 1943. We do believe, however, that we can now appreciate much better the situations which condition the time and type of intervention; the specific indications; the precise and painstaking details of technic, and the alertness, decision and conviction with which they must be carried out.

An appreciation of the serious danger from anoxia for even a brief time and the recognition of its presence and cause seem to be the basis of successful management.

Anoxia is an accepted term, but its use should carry a much greater implication because it is associated in respiratory obstruction with dangerous concentrations of carbon dioxide. There may be a sort of respiratory decompensation. Besides the general effect on the central nervous system with depression of the respiratory and other centers in the medulla, there are important secondary effects. These may involve the adrenals,[4] the muscle and conduction mechanism of the heart,[5] the circulatory system by both peripheral and central effects, and probably other organs, with respiratory and circulatory collapse or even shock.

It seems strange that in discussion of respiratory obstruction so little attention has been given to the narcotic and even lethal effects of carbon dioxide accumulation. There is evidence that it may be, in part at least, responsible for dyspnea and restlessness, mental depression, disorientation and coma, increased blood pressure with later fall, vasomotor failure and circulatory collapse.[6] All of these have been reported as symptoms of bulbar poliomyelitis.

Blalock, Harrison and Wilson [7] demonstrated in experimental respiratory obstruction that carbon dioxide may reach dangerous levels in the arterial blood even while oxygen saturation is still normal. That is one of the reasons we have felt that the oximeter could not be relied on in place of close clinical observation. This should indicate also that mere administration of oxygen is not enough, especially as flooding and pulmonary damage may prevent its absorption. The first essential is a cleared airway to allow absorption of oxygen and elimination of carbon dioxide.

Evidence has been recently given [8] that anoxia of even sixty seconds' duration may produce distinct morphologic changes in the brain [9]; that three to eight minutes of anoxia may produce widespread damage and necrosis in brain cells or death [10]; that repeated periods of hypoxia may have a cumulative effect [11]; that brain cells previously damaged by anoxia or infection are more susceptible to further damage by anoxia, and that edema, hemorrhage or necrosis of cells by virus infection may block oxygen absorption.[12]

Also, profound and lasting effects may follow even brief periods of anoxia although the patient lives.[13]


From Northwestern University Medical School and Evanston Hospital. Read before the Joint Session of the Section on Internal Medicine and the Section on Experimental Medicine and Therapeutics at the Ninety-Eighth Annual Session of the American Medical Association, Atlantic City, N. J., June 10, 1949.


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2. Communication from Jerome J. Sievers, Division of Communicable Diseases, State of Illinois.
3. Communication from H. N. Bundesen, President, Board of Health, City of Chicago.
4. Armstrong, H. G.: Principles and Practice of Aviation Medicine, ed. 2, Baltimore, Williams & Wilkins Company, 1943, p. 301.
5. Best, C. H., and Taylor, N. B.: The Psychological Basis of Medical Practice, ed. 4, Baltimore, Williams & Wilkins Company, 1945, p. 213.
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These include mental and emotional change, imbecility, insanity, athetoid and parkinsonian and even decerberate states.

The symptoms of anoxia are not always clear in the presence of other severe diseases. In fact they are all too often ascribed to the disease itself. Early symptoms of anoxia are headache, increased mental activity or occasionally brief euphoria followed by confusion, disorientation, irrationality, unresponsiveness, lethargy and finally coma. Antagonism and combativeness, which often occur, make it necessary to use less conservative measures not dependent on the patient's cooperation. Restlessness is an important early symptom. With it, the overactive patient requires more oxygen; also, the unwary attendant may be tempted to use sedative drugs, especially opiates. This may be disastrous to the patient fighting to get all possible oxygen. Dyspnea is usually an early symptom but may not be easily recognized in an exhausted patient, especially if sedatives have been given. Increased blood pressure occurred early in a high percentage of Grulee's series.[14]

Cyanosis is an uncertain sign that is poorly calculated by the average observer and greatly modified by such general factors as anemia, shock, pigmentation and carbon dioxide concentration. If pronounced, it is likely to be a late sign of imminent cardiovascular collapse and to mean that one has waited beyond the indications for intervention. According to Kubicek,[12] patients with bulbar poliomyelitis who become cyanotic most often succumb.

*Comparative Mortality from Bulbar Poliomyelitis*

| Locality | Years | Poliomyelitis: Total No. of Cases | Poliomyelitis: Bulbar Type | Bulbar Deaths | Bulbar Mortality Rate, % |
|---|---|---|---|---|---|
| Illinois outside Chicago.. | 1947-1948 | 1,242 | 105 | 39 | 38.8 |
| Chicago residents *..... | 1948 | 312 | 37 | 10 | 27.0 |
| Evanston hospital..... | 1947-1948 | 127 | 15† | 0 | 0 |

* There were 12 additional bulbar cases originating outside Chicago, of which 9 were fatal.
† Three of the 15 patients had no pharyngeal paralysis.

We classify respiratory difficulty in acute poliomyelitis clinically as of four types. With the first three there is general agreement.

1. Spinal: In the spinal type of respiratory difficulty the lesions are in the cervical and upper thoracic segments of the spinal cord with varying paralysis of the intercostal muscles and the diaphragm. Patients with this type do well in the respirator and fall easily into rhythm with it.

2. Bulbar paralysis with interference with the swallowing mechanism and resultant accumulation of secretion, food and fluids, and vomitus in or over the airway: If complications do not occur patients usually get over this difficulty in five to ten days.

3. Bulbar-spinal, a combination of the foregoing.

4. Other disturbances in rhythm and depth of respiration. Theoretically these could result from virus effect on the respiratory centers with a fulminating course. We made no such diagnoses in the 15 cases herein reported. We considered the clinical observations in so-called poliomyelitic encephalitis to be due usually to peripheral secretional obstruction plus the effect of anoxia and carbon dioxide excess on the medulla and other centers, since all patients were relieved rather promptly by the measures directed at relief of the obstruction and anoxia.

The picture of the so-called arrhythmias is confusing. One often sees patients with shallow, interrupted, cogwheel and wavelike respiratory movements. At times the intercostal muscles and diaphragm almost appear to oppose each other. We have seen such arrhythmias controlled (with serious results) for a time by thiopental sodium (pentothal sodium®), which would hardly be the case if the arrhythmia were due to central depression. A simpler explanation of this type of respiration is that it comes from a reflex or voluntary conflict between respiratory demand and the protective mechanisms which help to keep the patient from drowning in his own secretions. These irregularities usually disappear if free respiration is provided without delay.

We believe, then, that the primary difficulty in bulbar poliomyelitis is difficulty with the swallowing mechanism resulting in accumulation of secretion, food, fluids and vomitus in or over the airway, and anoxia. It is to be recalled that there is normally from 1,000 to 1,500 cc. of saliva per day, which is likely to be increased in nervous disease and with nausea.[13] To this must be added inflammatory secretion, food or fluid injudiciously given, and vomitus. We have recovered by suction from the pharynx in twenty-four hours over 2,000 cc. of fluid above any added for irrigation.

The usual mechanisms of expulsion of the fluid from the airway are here ineffective. Cough does not operate except where perfect postural drainage allows no fluid to accumulate at the level of the pharynx or beyond, since to get enough air for expulsive force deep quick inspiration would have to be made. This would result in aspiration of the overlying fluid as shown in figure 1. Cough may be difficult also because the medullary center is depressed even early, we believe, from anoxia and excess carbon dioxide. Therefore unless secretion is kept removed by treatment it will lead to anoxia by preventing ingress of air, by blocking bronchioles and by flooding and secondary damage to the respiratory area of the lungs.

The best evidence for the importance of anoxia is that the symptoms are usually so promptly relieved when the airway is cleared. In a case previously reported [1] the patient had gone from restlessness and disorientation to deep coma and had finally ceased to breathe for an estimated three minutes. Laryngoscopy disclosed that the larynx and pharynx were filled with viscid secretion which overflowed from the nose and mouth. The patient was deeply cyanotic and the pulse was almost imperceptible. A tracheotomy was hastily performed, the airway was aspirated and the patient was put in a respirator. In thirty minutes the pulse and color were good and the patient was conscious. In forty-five minutes he was demanding to be taken from the respirator. It is hard to assume that relief of any condition other than anoxia could account for this quick recovery.

Had this patient died, his death could easily have been ascribed to a so-called poliomyelitic encephalitis. Had he lived at the hypoxic level for twenty-four to forty-eight hours so that reactive changes in the brain

14. Grulee, C. G., Jr., and Panos, T. C.: Epidemic Poliomyelitis in Children, Am. J. Dis. Child. 75:24 (Jan.) 1948.

15. Christian, H. A., in Osler, W.: The Principles and Practice of Medicine, ed. 14, New York, D. Appeton-Century Company, Inc., 1942, p. 624.

cells registered histologically, the changes might easily have been ascribed to direct action of virus. The Minneapolis Research Commission[16] concluded that many of the clinical symptoms indicative of cerebral involvement in bulbar poliomyelitis were secondary to anoxia because they are relieved by an adequate supply of oxygen. That is decidedly our experience, especially when a cleared airway makes possible oxygen absorption.

On examination of the airway by bronchoscope or through a tracheotomy in these seriously ill patients we have almost invariably found excessive and usually thick secretion and occasionally mucous plugs. On removal of obstruction there has been in most instances a rapid improvement in the mental and other symptoms.

Another effect of respiratory obstruction has been detailed in a discussion of acute tracheobronchitis[17] and need only be outlined. Because of increased negative intrathoracic pressure in the presence of respiratory obstruction there is a cupping action on the capillaries of the alveoli and mucosa with the production successively of congestion, stasis, edema, exudation hemorrhage and even plugs, with secondary atelectasis.[18] Unless this is relieved secondary infection regularly occurs, as shown by Galbraith and Steinberg,[19] with pneumonitis and atypical forms of pneumonia so often reported in such patients. The same mechanism helps also to produce pulmonary edema, especially when anoxia and an excess of carbon dioxide lead to increased capillary permeability, as shown by Drinker.[20] These conditions quickly become irreversible; hence, intervention must be immediate.

Treatment based on the preceding ideas will be discussed in more detail.

Oxygen has long been recognized as important. Tracheotomy has also been granted a role, although at times grudgingly. The importance of postural drainage was emphasized in a paper on bulbar poliomyelitis in 1943,[1] and an attempt at that time was made to visualize the conditions making tracheotomy a necessary and effective measure. It had been repeatedly stated that use of the respirator was usually contraindicated[21] in bulbar poliomyelitis, but we have found that in just these cases it has its greatest value, especially if, when secretions have accumulated, tracheotomy is done to bypass them and so prevent their being drawn in by negative pressure with virtual self drowning.

A trial of these measures has been given on a large enough scale to appear to justify their value, especially in the Minneapolis epidemic,[22] but there does not seem to have been enough attention given to detail and appreciation of underlying factors to make them completely effective.

16. The Bulbar Form of Poliomyelitis: I. Diagnosis and the Correlation of Clinical with Physiologic and Pathologic Manifestations, The Minneapolis Polio Research Commission, report, J.A.M.A. **134**: 761 (June 28) 1947.

17. Galloway, T. C.: Laryngotracheobronchial Obstructions and Their Secondary Effects, Ohio State M. J. **36**: 851 (Aug.) 1940.

18. Kernan, J. D., and Barach, A. L.: The Rôle of Helium in Obstructive Lesions of the Trachea and Larynx, Tr. Am. Laryng. A. **59**: 230, 1937.

19. Galbraith, E. G., and Steinberg, B.: The Developmental Mechanism of Pulmonary Atelectasis, Ann. Otol., Rhin. & Laryng. **46**: 800 (Sept.) 1937.

20. Drinker, C. K.: Pulmonary Edema and Inflammation: An Analysis of Processes Involved in the Formation and Removal of Pulmonary Transudates and Exudates, Harvard Monographs in Medicine and Public Health, no. 7, Cambridge, Mass., Harvard University Press, 1945.

21. (a) Edwards, W. G.: Analysis of Fatal Cases of Poliomyelitis, California Med. **69**: 367 (Nov.) 1948. (b) Wilson, J. L.: Outline of the Essential Treatment of Bulbar Poliomyelitis, J. South Carolina M. A. **44**: 354 (Nov.) 1948.

22. Priest, R. E.; Boies, L. R., and Goltz, N. F.: Tracheotomy in Bulbar Poliomyelitis, Tr. Am. Laryng., Rhin. & Otol. Soc., 1947, to be published.

### OXYGEN

The advantages of oxygen are so well established in obstructed cases that its use requires little discussion. By its use while other measures are becoming effective the treatment may remain relatively simple. We have preferred to administer oxygen by nasal catheter (which is gratefully tolerated after a short time by even our younger patients) giving from 3 to 8 liters per minute. The catheter gets less in the way than tent or mask and does not hinder other treatment. We have found no advantage in the use of helium, which requires a closed system.

Administration of oxygen does not, however, relieve the physician of responsibility for clearing the airway, especially since proper respiration is so important to eliminate rapidly the dangerous excess of carbon dioxide which is present in obstructive cases and which cannot adequately be controlled by the slowly acting compensatory mechanisms.

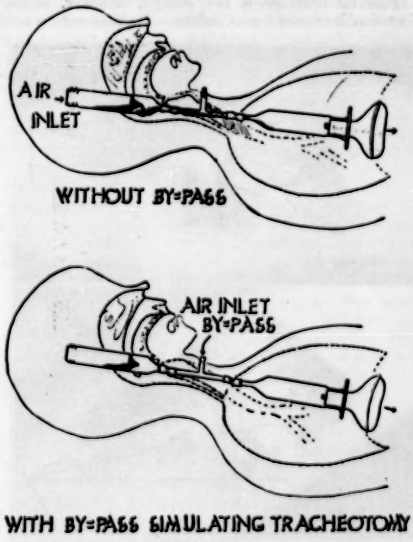



Fig. 1.—A model to simulate the effect of voluntary breathing or a respirator when there is fluid in the upper airway. With moderately viscid fluid, intravenous tube, T tube and aseptosyringe it acts as shown. When the by-pass is open no fluid is drawn in—illustrating the effect of tracheotomy. (This and the following illustration are reproduced from *Archives of Otolaryngology* **46**: 125 [Aug.] 1947.)

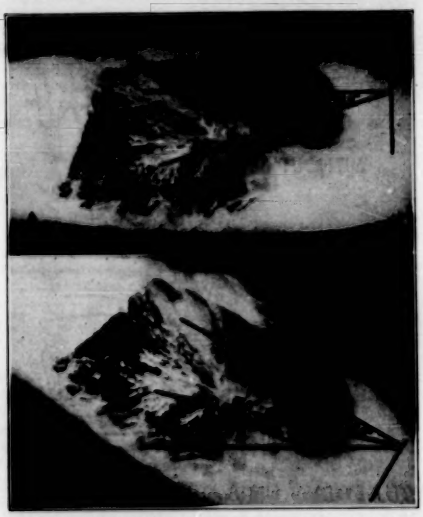
### POSTURAL DRAINAGE AND ASPIRATION

An important procedure which is little understood is postural drainage. One of us has previously emphasized the great value of this procedure in acute infectious tracheobronchitis[17] and other forms of respiratory obstruction. Cough and other mechanisms are here ineffective. Ciliary action, if of any avail, as shown by Leonard Hill,[23] may be twice as effective with the aid of gravity. The angle of flow must be visualized from the anterior cervical area to the posterior thoracic region. As shown by figure 2, the declivity from

23. Hill, L.: Ciliary Movements in the Trachea, Lancet **2**:803 (Oct. 20) 1928.

the body axis of the trachea and bronchi is about 20 degrees. To get an actual flow from 5 to 15 degrees must be added above the horizontal, and we have usually kept the patients at a 30 to 35 degree angle of elevation. Wilson [21b] has emphasized the importance of this factor. Inattention to this has seemed the commonest error in treatment, as shown by observations and illustrations of treatment in which the foot of the bed was only raised a few inches by blocks. Insufficient elevation of the bed could be the cause of many "unexplained cases of anoxia." It is equally important that the bed does not sag, that the head is not raised or the neck twisted so that a pool of secretion lies in or over the larynx. In infants a prone position with the face to one side is well tolerated and allows fluids to gravitate to the cheek and nasopharynx.

Postural drainage is not enough, however, unless secretion is removed as it collects. Because even a few minutes of anoxia can be exceedingly serious in these critically ill patients, we have not been of the opinion that we could depend on intermittent mechanical suction. We believe that continuous water suction is most important. It is used gently through a collecting bottle attached with a rubber tube (firm enough to prevent collapse) to a dependable suction apparatus with a valve to prevent backflow. The ordinary faucet attachment has not proved satisfactory. A soft rubber tube of moderate size with a lumen of at least 2 mm. is cut obliquely; its edges are rounded in a flame and a small counter opening made so that it will not grasp mucosa. It is then placed where secretions tend to pool, or a "whistle tip" catheter may be used. If posture is right this should be in the upper pharynx or cheek but may need to be in the hypopharynx. If gently placed, especially with the patient receiving some local anesthesia, it is well tolerated after a short time and causes much less nausea or interference than interrupted mechanical suction. The latter, however, may still have to be used occasionally. Connecting tubes should be of glass to permit observation of flow and should be of sufficient caliber. Medicine dropper tubes substituted as connectors against orders in 1 case were not able to pick up viscid secretion even when applied directly to it, with serious results.



*2.*—The lower airway is outlined with radiopaque oil: *A* represents the declivity of trachea and bronchi from body axis; *B* shows minimum elevation necessary for useful postural drainage.

The collecting bottle provides a means to measure aspirated secretion. This gives an index of fluid that must be added to maintain fluid balance and keep secretion from becoming sticky.

Postural drainage is important from the first onset of difficulty in swallowing. Dr. Edward Piszczek, the Cook County health director, wisely counsels mothers to keep the head low in such patients even during transport to the hospital.

### FLUIDS AND NUTRITION

Fluid and electrolyte balance is maintained parenterally. In consideration of the large amount of fluid lost, an adult is given from 2,500 to 3,500 cc. of fluids roughly in the proportion of one third isotonic sodium chloride solution or Ringer's solution and two thirds of 5 per cent dextrose in water. It is important to see that the patient does not become dehydrated and that secretion does not become too viscid to flow and to be easily removed. Cerebral edema, however, could occur from overhydration as possibly could pulmonary edema. In 1 case we believed that generalized edema was due to sodium excess, as it was controlled by withholding the saline solution.

After the first few days a protein hydrolysate is given intravenously. Usually we have used a vitamin mixture by the same route after a few days. In our earlier cases in which protein and vitamin supplements were not given we believed that there was greater incidence of decubitus ulcers and poorer healing of tracheotomy wounds.

When the patient begins to swallow, usually after five to eight days, gavage is employed. A medium-sized catheter is used through the nose into the esophagus and is kept carefully closed except during feeding. A Levine or similar tube seems less well tolerated, is harder to introduce and is more likely to induce vomiting or reflex from the stomach. Feedings are begun with from 50 to 100 cc. and, depending on the patient's feeling of fulness, are increased in adults up to 300 or 400 cc. Usually water and a food formula are alternated every two hours, and about 1,800 calories are given daily. After feeding the patient is allowed to lie flat for one-half hour, then returned to the position for postural drainage as long as may be necessary. Free feeding is not permitted until it is well taken.

### TRACHEOTOMY

It may become necessary before dangerous anoxia is established to perform a tracheotomy in order to by-pass secretion which might be drawn into the pulmonary bed by voluntary or mechanical respiration, as shown by figure 1, and to permit easy aspiration of secretion which may already be present or may later collect. This is especially important in cases in which some pulmonary edema is present. Air pressure within and without the chest must be kept nearly equalized so that a dangerous degree of negative pressure cannot occur.

From a considerable experience with respiratory obstruction it is hard to understand the dread with which many clinicians seem to regard tracheotomy.

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As pointed out by Jackson,[24] Negus [25] and others, the mortality of the operation is a fraction of 1 per cent. Often bad results are ascribed to the operation itself rather than to the usually serious condition for which it is done; there is often delay in calling the laryngologist until serious anoxia with pronounced depression and cyanosis with irreversible changes are already present. Certainly a competent laryngologist should be a member of the poliomyelitis team and should examine the patient early in order to help assess the need for intervention while it can be done deliberately and without confusion, and while the patient still has rallying power. We reported 3 tracheotomies in 1943 [1] and have since performed the operation on 10 other patients with poliomyelitis without noteworthy complications. Rather to our surprise, even with the respirator, we have had no pneumothorax or important emphysema. This probably did not occur because our tracheotomies were done over a bronchoscope or endotracheal tube and because the airway, which was cleared so that pressures were equalized before the skin was incised, was kept clear postoperatively. The fascial planes were not undercut and the pretracheal fascia was incised in the midline without separation; the operative funnel was well packed after the insertion of the tube. Priest, Boies and Goltz [22] in 1947 reported tracheotomy in 75 patients without serious results. Those who blame the operation for pneumothorax and emphysema should remember that emphysema with atelectasis is not infrequent in respiratory obstruction without operative intervention.[26]

We believe that the good results in this series are due largely to splendid cooperation from the outset between other clinicians and the anesthesiologist and laryngologist, to good nursing and early hospitalization, so that the man to whom problems of respiratory obstruction are commonplace is allowed full responsibility from the outset. From conversation with colleagues elsewhere we gather that all too often the practitioner, confronted by a situation which he does not understand, takes the position that he must protect the patient against the otolaryngologist, whom he considers only a technician to be called in as a last resort to do a manual job on the decision of some one else.

The problem of tracheotomy in poliomyelitis is in the stage where the same procedure in acute infectious tracheobronchitis was twenty years ago, when the mortality was from 50 to 70 per cent.[27] Now with early cooperation in that disease, the problem of which has much in common with bulbar poliomyelitis, we have had 14 successive recoveries in cases requiring tracheotomy. Davison [28] was able to report recently treatment of 15 such patients without a death. We believe similar results should not be exceptional in bulbar poliomyelitis.

There has seemed to be considerable semantic error in discussing this disease. To designate the relatively safe procedure of tracheotomy as radical is surely wrong, when it becomes much less conservative to stand by while a patient grows desperately ill from obstruction and anoxia. It is misleading to speak of "elective tracheotomy" being performed when case reports disclose that profound and progressive anoxia were already present to make the intervention an emergency one. This does not mean that we are committed to tracheotomy before there are definite indications. In this series it was performed on 6 of 12 patients with pharyngeal paralysis.

The tracheotomy in poliomyelitis should be relatively high, through the second and third tracheal rings, in order to permit easier care of the patient if the respirator is required. Special heads on the respirator or collarless respirators [29] facilitate this care, but we have found that the collar on the standard respirator can be satisfactorily retracted by a "gray iron" bar bent with wrenches and held under the steel flange. Proper mechanical humidification as described by Davison, and not steam, is important to prevent crusting after tracheotomy. If that is properly done bronchoscopic removal of plugs or crusts is seldom necessary. Irrigation through the tube, at intervals, with one to two droppers of 3 per cent warmed sodium bicarbonate solution followed by isotonic sodium chloride solution, aspirated gently by beveled rubber tube with the patient in the postural drainage position, usually prevents plugging.

The greatest value of the operation has been to by-pass secretion. If one visualizes the simple hydraulic principles involved, that viscid secretion will either prevent moving gas from entering an area of negative pressure or will be propelled by it into that area, the logic of tracheotomy should be obvious. We went through a period of grief with intubation but now see no indication for its use except for temporary bag insufflation of oxygen during tracheotomy. It does not by-pass secretion.

### INDICATIONS FOR TRACHEOTOMY

The indications for tracheotomy are based on the experience which we believe indicates the validity of the previously discussed ideas. They are stated rather categorically. We post them in our ward not only for the guidance of our house staff and nurses but to prevent ourselves from being swayed to procrastinate by the idea that a particular case is quite different from its predecessors.

Following are the indications for tracheotomy:

1. Progressive anoxia with secretion in the upper airway.
2. Unconsciousness or pronounced restlessness in a patient who does not respond to other treatment in a few minutes.
3. Pronounced restlessness or stupor in a patient in a respirator, even if the paralysis is apparently of a spinal type.
4. Fluid accumulation not otherwise certainly taken care of in a patient who requires a respirator.
5. Bilateral paralysis or spasm of vocal chords.
6. Rapidly progressive bulbar symptoms.
7. Grave signs of vasomotor failure.
8. Untrained or inefficient attendants, inadequate equipment or poor cooperation of the patient, with doubt that the airway will be kept constantly free of secretions.

These indications merit further discussion.

Symptoms of anoxia must be closely watched for, including restlessness, dyspnea, disorientation, mental

24. Jackson, C.: Tracheotomy, S. Clin. North America **15**: 117 (Feb.) 1935.
25. Negus, V. E.: An Explanation of the Respiratory Failure Sometimes Occurring After a Successful Tracheotomy. Tr. Am. Laryng. A. **60**: 92, 1938.
26. Holt, L. E.: Diseases of Infancy and Childhood, ed. 8, New York, D. Appleton & Company, 1922.
27. Jackson, C. L.: Acute Laryngotracheobronchitis, J. A. M. A. **107**: 929 (Sept. 19) 1936.
28. Davison, F. W.: Acute Laryngotracheobronchitis, Arch. Otolaryng. **47**: 455 (April) 1948.
29. Peterson, R. L., and Ward, R. C.: Tracheotomy in Poliomyelitis Simplified with New Respirator, Arch. Otolaryng. **48**: 156 (Aug.) 1948.

depression, increased blood pressure, or later fall, and cyanosis. No patient should become unconscious under observation.

Under the third indication it is not always possible to diagnose exactly the type of involvement, especially because an originally spinal involvement may spread quickly to the bulb. Moreover, fluid may accumulate not only from pharyngeal paralysis but because of bronchial or pulmonary inflammation or pulmonary edema.

Indications 6 and 7 are probably signs of serious anoxia and carbon dioxide accumulation with approach to the critical point of irreversibility.

Uncooperativeness, while it may be a matter of temperament, is in our experience much oftener an important sign of anoxia, which makes it all the more important to help the patient in spite of himself.

In doubtful cases, tracheotomy is in our opinion a much safer procedure than waiting; the procedure makes it much easier and more certain to clear the airway and keep it cleared. For that reason we believe tracheotomy should be performed oftener, not less often, when the attending team has had little experience with the disease.

### THE RESPIRATOR

It has been stated authoritatively and repeatedly [21] that use of the respirator is usually contraindicated and may be dangerous in bulbar poliomyelitis. To the contrary we have found here almost its greatest usefulness, without danger if a clear airway is insured. It is easy to see that, if the upper airway is filled with viscid secretion and suction is made below it by a normal or mechanical respiratory mechanism, the air column will tend to push ahead of it a movable diaphragm of viscid secretion, though some air may bubble through. It is evident that such a procedure might easily drown a patient in his own secretion.

It should be equally clear that if such secretion is kept removed by postural drainage and especially if an accumulation over the larynx is short circuited by tracheotomy so that changes in air pressure are equalized within and without the area of ventilation no fluid will be drawn in (fig. 1). The immediate relief of such patients, the easy adaptation to the rhythm of the machine and the grateful rest which they then enjoy offer excellent proof of this.

Bulbar patients may need a respirator for several reasons. Occasionally we have seen a primarily spinal type of paralysis spread up to involve the medullary center. Our experience has indicated, however, that most often the medullary center is depressed by anoxia and carbon dioxide and that the depression may have become rather profound before the anoxic factor is recognized and corrected. There is usually also a considerable degree of exhaustion by the time action is taken, in part simply because of the muscular effort involved against secretory obstruction but also on the mental and nervous side by the conflict between reflex and voluntary mechanisms striving to ventilate the lungs, yet at the same time attempting to prevent the aspiration of secretion. Again the fact that in the serious cases here reported relief was rather rapid on clearing the airway and instituting use of the respirator indicates that anoxia and not virus infection of centers was the chief factor.

We have found it possible to perform tracheotomy in an opened respirator while oxygen from a bag was insufflated through an endotracheal tube, but surgical intervention should seldom be delayed until such a procedure becomes necessary. This procedure is facilitated by the use of the Monaghan collarless respirator.[29]

Also the respirator may, if the medullary center is out, tide over the patient during the difficult switchback from control of respiration through the chemoreceptors, effective under hypoxia, to a recovered medullary center which will normally respond to carbon dioxide and changes in hydrogen ion concentration.

The treatment which has been outlined may be employed in other conditions with the same manifestations of respiratory difficulty and secretional obstruction. It has been used successfully at the Evanston Hospital combined with curarization in severe tetanus [30] and in a patient with presumed myasthenia gravis under treatment with neostigmine in whom there developed spasm, fluid accumulation and coma, apparently from anoxia.

### SUMMARY

1. We believe that anoxia and carbon dioxide accumulation due to difficulty in swallowing, with secretional obstruction, are responsible for most severe central effects in bulbar poliomyelitis.

2. Treatment designed to clear the airway and relieve obstruction has been successful in 15 consecutive cases of bulbar poliomyelitis in this series.

3. Such results should not be exceptional in bulbar poliomyelitis.

4. A physician trained in the recognition and treatment of respiratory obstruction is an essential member of the poliomyelitis team.

## ABSTRACT OF DISCUSSION

Dr. Albert G. Bower, Pasadena, Calif.: Poliomyelitis struck hard in Los Angeles County during 1948 with 3,165 patients, of which 3,089 were hospitalized in the Contagious Disease Hospital on my service; 603 cases showed bulbar involvement. Including the cases of the previous two years, a total of 783 patients with the bulbar type were treated, from a total poliomyelitis load of 4,774 patients. Following the lead of Dr. Galloway in 1943 and of the Minneapolis group three years later, we cautiously performed a few tracheotomies in 1946, usually as a desperate final gesture, for the conservative members of the staff for the most part disapproved. Some patients died, some responded slowly but eventually recovered and some improved dramatically, but there was a higher proportion of survivals by far than in similar types of patients in the past. In 1947 we increased our experience, so that by 1948, 233 tracheotomies were performed in a group of 284 patients with evidence of obstruction to a free airway. The tracheotomies were performed earlier and earlier in an attempt to prevent anoxia. Indeed, a slogan for the treatment became, "Prevent Anoxia!"

Lack of oxygen should be corrected immediately, but prevention of anoxia is far better. Its etiologic basis generally fits the patterns described by Dr. Galloway, but paralysis as well as resistance to movement on the part of tight muscles, so characteristic in this disease, of themselves at times decidedly limit respiratory excursion. Hot compresses of light material and judicious doses of curare afford great help in selected cases. Anoxia may result from edema constantly

30. Turner, V. T., and Galloway, T. C.: Tetanus Treated as a Respiratory Problem, Arch. Surg. 58:478 (April) 1949.

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present in the cord and brain but also from involvement of the cortex by invasion of the virus. We have seen well oxygenated patients with correct acid-base balances, with adequate serum proteins and properly maintained albumin-globulin ratios, continue to present typical encephalitic involvement. Reference to the electrolytes and loss of serum proteins, with changes in the albumin-globulin ratio, is important. In respirator-treated patients, these values are usually thrown out of balance. The sicker the patient, the greater the imbalance, and neither the respirator and its accessories nor tracheotomy will save these patients unless these other factors are sufficiently restored to normal to permit immediate survival. After tracheotomy, give oxygen, oxygen and helium or air through the tracheotomy tube. Inasmuch as this tube itself reduces the lumen of the trachea, always use the largest compatible size. The practical points are: do not allow the tube to ride on the bifurcation of the trachea in a child; cut it off short if necessary.

DR. F. R. KLENNER, Reidsville, N. C.: It might be interesting to learn how poliomyelitis was treated in Reidsville, N. C., during the 1948 epidemic. In the past seven years, virus infections have been treated and cured in a period of seventy-two hours by the employment of massive frequent injections of ascorbic acid, or vitamin C. I belive that if vitamin C in these massive doses—6,000 to 20,000 mg. in a twenty-four hour period—is given to these patients with poliomyelitis none will be paralyzed and there will be no further maiming or epidemics of poliomyelitis.

DR. JOE R. BROWN, Minneapolis: We agree in Minneapolis as to the extreme importance of anoxia and maintenance of adequate airway in poliomyelitis; however, we disagree in part with Dr. Galloway. We have seen cases showing definite and severe inflammatory involvement of the respiratory center and the circulatory center in the medulla. These cases have been studied histologically and have been reported in the literature. From 1946 to 1948, we saw 318 cases of bulbar poliomyelitis with a mortality of 34.2 per cent, in spite of every effort made on our part to maintain an open airway. Analysis of the mortality statistics revealed that among those with pure cranial nerve involvement the mortality was 5.6 per cent. These patients died as a result of obstructed airway either because of inadequate time (the patient being admitted in extremis) or inadequate judgment on our part as to when to perform a tracheotomy. Of those with involvement of the respiratory center proved pathologically as well as clinically, there was a 70 per cent mortality. In those with involvement of the circulatory center, also proved histologically, the mortality rate was 85 per cent. In those patients with relatively pure encephalitic symptoms, the mortality rate was 0.3 per cent. In those who suffered from involvement of the bulb combined with involvement of the diaphragm and intercostals, the mortality rate was 54 per cent. I studied particularly 30 recent fatal cases in which 13 of the deaths were due to circulatory failure, 6 to central respiratory failure, 6 to an obstructed airway and 5 to massive atelectasis. I wish to emphasize the importance of pulmonary edema as occurring in many cases of bulbar poliomyelitis. Omission of consideration of these other factors is a dangerous oversimplification of the treatment problem.

DR. W. ALLEN CONROY, Chicago: I am an anesthesiologist; my greatest enemy is cerebral hypoxia, and I want to support Dr. Galloway's contention that the error most often made in the treatment of respiratory disorders is failure to provide an adequate airway. It would be better to perform a few superfluous tracheotomies than to miss those which need to be done. The procedure becomes even more important if curare is given for spasm. The patient who is properly curarized is in even greater danger of obstruction from the collapsed throat. He needs even more help from the respirator. Many symptoms of damage to the vital centers that have been attributed to the virus are due to the initial hypoxia suffered by the patient before the physician treats him. Many times I have been called on to place an intratracheal tube to provide relief of obstruction. The results being so dramatic, it then became difficult to convince the laryngologist that he should perform a tracheotomy. I would warn all physicians that such temporary help should be anticipated from an anesthetist or from a laryngologist, but the physician should not be deceived by this temporary improvement. If placing the tube resulted in improvement for the few minutes, the patient had better have a tracheotomy, because the endotracheal tube cannot be left in indefinitely. In managing the tracheotomy tube, use a jacket respirator that does not cover the neck or put in a tube that is flexible and that will reach up to the collar. I plead for the use of tracheotomy in any condition in which the swallowing of mucus is impaired, such as in esophagectomies or in compression lesions of the upper cervical cord, in which the patient cannot cough.

DR. GEORGE J. BOINES, Wilmington, Del.: Anoxia in bulbar poliomyelitis is not due entirely to reduced oxygen or diminished air intake resulting from obstruction to the airway by the patient's secretions. Anoxia may be due in part to the following: 1. Neuromuscular shock produced by the generalized virus infection. 2. Psychologic shock in a patient "scared to death" when he realizes he has poliomyelitis. 3. Malnutrition resulting from vomiting, inability to swallow and toxemia. 4. Dehydration produced by the fever and vomiting. 5. Increased viscosity of the blood due to extravasation of fluids into the capillary bed and to increased coagulability of the red blood cells, called blood sludging, as observed and described by Drs. M. H. Knisely and E. H. Bloch of Chicago. Intravenous fluids and blood transfusions counteract this condition. 6. Another important cause of anoxia is reduced vital capacity of the chest caused by muscle spasm, particularly prominent in the posterior neck muscles and causing hyperextension of the neck. This position makes it mechanically difficult for the patient to breathe freely. Also, spasm in the intercostal muscles and diaphragm keeps the chest in the state of inspiration, producing the so-called frozen chest, so that free exchange of air is greatly diminished by difficulty in expiration. The most effective way to correct this condition of muscle spasm is by intramuscular injection of d-tubocurarine (intocostrin®), according to the method originally described by Dr. Nicholas Ransohoff. Since 1946 we have employed d-tubocurarine in over 300 patients, including many with bulbar involvement. The relaxation that is produced is rapid and safe. The bulbar patient is kept in the oxygen tent in the postural drainage position; careful suction of the throat is carried out by the nurse, who is in constant attendance. Early diagnosis and hospitalization are far more important in bulbar poliomyelitis than is tracheotomy. Tracheotomy may be needed in the occasional patient who has complete paralysis of the vocal cord, but this rare. Tracheotomy adds the disadvantage of a smaller air intake, which must be kept constantly clean and free from pulmonary secretions. The operation and tube add to the discomfort of the patient, whose strength is already badly depleted. In the 1947 and 1948 epidemics in Delaware about 250 patients were treated in our clinic; we had 20 patients with severe bulbar involvement who recovered completely without tracheotomy. We used oxygen, postural drainage, intravenous dextrose, blood transfusions, vitamins, penicillin, d-tubocurarine and early ambulation. The respirator was not used.

DR. MARTIN H. SEIFERT, Wilmette, Ill.: Dr. Bower expressed our own dilemma from 1943 to 1946 in making ourselves believe that we should do tracheotomy earlier. We have not had too much trouble with acid-base balance. If there is an error, it is in too much negative pressure and too rapid a rate in the respirator. Patients can drown from vomitus. We do not feed them anything by mouh until the gag reflex returns. We have also observed the histologic proof of involvement of the respiratory center and cardiovascular center to which Dr. Brown referred. It seems that the statement should be modified by saying that these are the results of virus infection plus hypoxia, because hypoxia has been found to produce about

the same picture. Dr. Galloway and I are pleading for a change from the fatalistic attitude that bulbar poliomyelitis is an overwhelming infection of the brain stem with no possibility of remedial treatment. I have seen and taken care of patients with poliomyelitis for eighteen years. Patients with bulbar poliomyelitis of the same type that we have seen in the last two and a half years have died under my care before this. It took a supervising nurse and a laryngologist to teach me that there was something to do about bulbar poliomyelitis. What we are trying to say in this paper is, first, secretional obstruction secondary to difficulty in swallowing kills the patient, as a rule; second, constant nursing care, which is expensive and sometimes objected to by those who pay for that care, is also life saving; third, in patients with paralysis of the swallowing mechanism, postural drainage should start at home and should be adequate; fourth, constant suction with meticulous attention to detail plus mechanical suction for emergency use is essential; fifth, with adequate clearing of the airway, I plead for the use of the respirator if respiratory failure occurs in bulbar poliomyelitis. I have used it for nine years and have seen no harm from its use in bulbar poliomyelitis; sixth, when these procedures do not suffice to keep the airway clear, perform a tracheotomy before the patient is near death; seventh, include a laryngologist in the poliomyelitis team in every hospital. He is best qualified to help with the problem of respiratory obstruction. The anesthesiologist also should be immediately available.

## ANESTHESIA AND THE ROLE OF ANESTHESIOLOGISTS OF TODAY

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It is in no boastful spirit and it is without exaggeration that we venture to claim that the tremendous advances in surgery in recent years parallel directly the advances in anesthesia and the care of patients before and after operation. The development of new methods and new agents and the constantly increasing knowledge of human physiology have made many modern surgical procedures not only possible but practicable.

### STUDIES PRIOR TO ANESTHESIA

When a patient comes to the hospital prepared to undergo surgical intervention, a careful history and physical examination will normally be adequate in the assessment of his physical status. Some of the simpler laboratory investigations are considered necessary. If the surgical or anesthetic procedure which is contemplated is likely to place undue stress on the patient, it is necessary to conduct investigations in greater detail. These, with the newer methods, are valuable in estimating a patient's tolerance to the stress and strain of operation.

*The Hematocrit Reading.*—The value of hematocrit, previously considered only if low, is now realized to have considerable significance if it is raised above the normal figure.[1] The higher the hematocrit, the more viscid is the patient's blood and the harder does the heart have to work to maintain an adequate output. Plethoric patients who have suffused conjunctivas and an elevated hematocrit may exhibit a slightly cyanotic tinge to the lips and in the nail beds. Many suffer from exertional dyspnea and some degree of orthopnea. This picture is typical of the polycythemic patient. These signs and symptoms are to be considered danger signals. It is believed that patients who have a hematocrit over 50 are not suitable subjects for general anesthesia. The possibility of cardiac failure following increased strain placed on the cardiovascular system by operation and anesthesia cannot be excluded. If general anesthesia is induced, such patients will exhibit a capelike area of cyanosis covering the head, neck and shoulders, which will persist in spite of a high concentration of oxygen in the anesthetic mixture and in the presence of a perfectly clear airway. Venesection with administration of fluids intravenously is, under these circumstances, warranted. If these methods fail to produce improvement, operation should be postponed except in the presence of an acute surgical emergency. Experience has shown that, when time is the essence and the degree of surgical emergency does not permit complete preparation of the patient for operation, regional or spinal anesthesia is to be preferred. Operative hazards can be minimized, and during the immediate postoperative period adequate measures may be undertaken to prevent venous thrombosis.

*Blood and Plasma Volume.*—When time permits and in order to avoid disaster during operation or the occurrence of cardiovascular accidents during the postoperative period, elucidation of the causes involved in alteration of the value for hematocrit should be complete. Studies of blood and plasma volume, including values for total circulating protein, will be more informative than a hematocrit, red blood cell count or single determination of the value for plasma protein. Deficiencies or excesses may be recognized, and it is thus possible to recommend the optimal replacement or withdrawal therapy. Chronically ill and emaciated patients are frequently observed to have diminished volumes of plasma and red blood cells. This may result in a normal hematocrit and normal concentration of plasma protein, when the latter is expressed in grams per hundred cubic centimeters. This leads to the erroneous concept that the patient's circulating fluid balance and nutritive state are satisfactory. Studies of blood volume, however, will reveal the true status of such patients. Restoration of the needed elements will improve their ability to withstand surgical and anesthetic procedures. Patients who have simple dehydration, rapidly induced, will have a low plasma volume with a high hematocrit. If the value for total plasma protein is normal, they may be treated by the administration of fluids alone. If the plasma protein is low, it is wiser to treat them by administration of plasma. In the presence of anemia and an elevated value for the plasma volume, the administration of washed red cells or whole blood (once again depending on the value for total plasma protein) is indicated. Polycythemic patients, in spite of having a plasma volume that either is increased or is at the higher limit of normal, will benefit by venesection. If not more than 500 cc. of blood is withdrawn daily, it is not necessary to give fluids intravenously, though the patients should be encouraged to take fluids by mouth. Because their total plasma protein is usually normal and because they have the ability to draw on protein reserves in the presence of plasma dilution, daily vene-

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Read in the Symposium on Modern Developments in Surgery in the General Scientific Meetings at the Ninety-Eight Annual Meeting of the American Medical Association, Atlantic City, N. J., June 7, 1949.

1. Barbour, C. M., Jr.: Polycythemia in Relation to Anesthesia, read before the Annual Meeting of the American Society of Anesthesiologists, Inc., Nov. 4, 1948; to be published.

section is justifiable. The blood may be banked and subsequently returned to the same patient during operative intervention, should the need arise.

*Evaluation of Pulmonary Function.*—Ideally, every patient should have a roentgenogram of the chest preoperatively to exclude the presence of pulmonary disease. Evaluation of each patient's pulmonary function is of equal importance. It has been customary in the past to consider a patient's vital capacity as a satisfactory guide to his ability to withstand operation and anesthesia. We have learned from recent studies by Cournand and Richards[2] and Rayl[3] that this is a totally inadequate and possibly misleading guide to a patient's true status in regard to pulmonary function. It is recognized that pulmonary function may be divided into two components, ventilation and respiration. Ventilation consists of the gross movement of air or gases into and out of the lungs. The action is mechanical, and the symptom of insufficient ventilation is dyspnea. Respiration consists of gaseous interchange of oxygen, carbon dioxide and nitrogen. The pulmonary alveoli are largely involved in this physical-chemical process, and the symptom of respiratory insufficiency is cyanosis. The two segments of pulmonary function are closely interrelated. In the presence of respiratory insufficiency the respiratory center is stimulated. If the center is rendered inactive by trauma or anesthesia the carotid mechanism may take over to reestablish oxygenation. Dyspnea (ventilatory insufficiency) when pronounced and prolonged, while the patient is at rest, leads to cyanosis. In the majority of patients preoperative evaluation of pulmonary sufficiency may be gaged by determining ventilatory function alone. Relatively simple tests have been developed for this purpose.

Maximum Breathing Capacity: Maximum breathing capacity is the maximum volume of air that can be ventilated in one minute expressed in liters per minute, whereas vital capacity is determined by the volume of one breath without regard to any time factor. Maximum breathing capacity, therefore, has proved to be a much more dependable test. The normal value for the average woman is 100 liters per minute and for the average man, 150 liters per minute. The test is made by having a patient breathe as rapidly and as deeply as possible for one-half minute through a high velocity respiratory valve. The air is collected in a Douglas bag and is subsequently measured by expressing it from the bag through a gas meter calibrated in liters.

Walking Ventilation: Walking ventilation, first described by Warring,[4] is a test for ventilation under stress. The patient is walked 180 feet per minute for four minutes. The exhaled air collected during the last three minutes of the test is measured by emptying the Douglas bag through the gas meter. The normal range is from 8 to 30 liters per minute. When the walking ventilation exceeds 50 per cent of maximum breathing capacity dyspnea will appear under minimal stress. Pulmonary efficiency is materially impaired, and administration of an anesthetic for a major surgical procedure will be hazardous.

Breath Holding: Breath holding parallels the efficiency of the alveolar membrane and indicates the patient's tolerance to oxygen deficiency. Because the test is subject to wide individual variation it is considered of relatively minor significance, but it adds to the sum total of knowledge regarding pulmonary efficiency.

Fluoroscopy: Fluoroscopy is of vastly greater importance. In experienced hands, differential estimation of diaphragmatic and costal motion gives valuable information in regard to the pulmonary function of one lung compared to the other. In addition to this information, fluoroscopy reveals air trapping. Diminished clouding of shadows on the involved side occurs during forced expiration. The heart and mediastinum may shift toward the opposite side. This evidence is of significance in the presence of emphysema, overdistention or bronchial stenosis. A concrete example is worthy of mention:

A man aged 57 with a history of emphysema was found to have a neoplastic lesion of the lower lobe of his right lung. It seemed to be in a favorable position for operative removal, but the question whether he was operable arose. On the basis of clinical evaluation it seemed doubtful; yet no one relished the idea of making the decision. He was put through a series of tests with the following results: By fluoroscopy, rib motion was found to be 50 per cent on the right and 75 per cent on the left. Diaphragmatic motion was 50 per cent on the right and 75 per cent on the left with an evaluation, therefore, of total motion of 250 of a possible 400. In addition there was appreciable trapping of air in the lower lobe of the right lung distal to the lesion and moderate trapping in the lower lobe of the left lung. Ventilatory motion on the right equalled 40 per cent ($\frac{50 + 50}{250} \times 100 = 40$), whereas usually the right lung is responsible for 53 per cent of ventilatory motion in a normal subject. His maximum breathing capacity was 37 liters per minute (normal 120 liters), whereas his walking ventilation was 20 liters per minute and therefore in excess of 50 per cent of his maximum breathing capacity. On the basis of these calculations it was decided that the man could not tolerate general anesthesia for a major surgical procedure and, if he did, that subsequent to operation he would be a bedridden respiratory cripple. He was advised to forego surgical treatment because the data confirmed the clinical evaluation.

Differential Bronchospirometry: A final test—differential bronchospirometry—may be undertaken to reveal minute ventilation, oxygen absorption and vital capacity in each lung. Highly specialized equipment is required. The test is strenuous for the patient and should seldom be required for clinical evaluation, although the method will continue to be useful in research and in critical evaluation of selected patients.

With the results of these tests available for study, operability in the presence of emphysema, or of emphysema and a neoplasm involving a lung, may be established. The surgeon can avoid the production of respiratory cripples, and the anesthesiologist can be guided in the choice of anesthetic agents and in methods of their administration. The occurrence of dyspnea as a forerunner of cyanosis will be of added significance. He will be able to keep the surgeon informed of the status of the patient during operation in relation to known base lines established preoperatively. It is hoped that new mechanical aids will come into common use to aid in these minute-to-minute evaluations.

Maintenance of Collateral Respiration: Recent researches in respiratory physiology conducted by Alley and Lindskog[5] have shown that collateral respiration may play a part in reducing the incidence of

2. Cournand, A., and Richards, D. W., Jr.: Pulmonary Insufficiency: I. Discussion of a Physiological Classification and Presentation of Clinical Tests, Am. Rev. Tuberc. 44:26, 1941.
3. Rayl, D. F.: The Effect of Thoracic Surgical Procedures upon Pulmonary Function, to be published.
4. Warring, F. C., Jr.: Ventilatory Function, Am. Rev. Tuberc. 49:432, 1943.
5. Alley, R. D., and Lindskog, G. E.: Pharmacologic Factors Influencing Collateral Respiration: Possible Relation to the Etiology of Pulmonary Complications, Ann. Surg. 128:497, 1948.

postoperative atelectasis. Collateral respiration is maintained through the pores of Kohn (pulmonary alveolar vents). Alveoli in a lobule whose bronchiole is blocked by a plug of mucus may remain aerated by diffusion of air through the pores from adjacent lobules. Release of histamine into the circulation may be a cause of edema with blockage of these small openings, thus preventing any collateral respiration. Curare has been incriminated as causing release of histamine or histamine-like substances which in turn produce postoperative atelectasis. This work explains the cause of and the sometimes otherwise unexplainable occurrence of atelectasis.

Control of this problem of collateral respiration may be achieved through the preoperative use of antihistaminic agents. Oral administration of diphenhydramine (benadryl*) hydrochloride or tripelennamine (pyribenzamine*) hydrochloride preoperatively may prevent the action of histamine affecting the pulmonary alveolar vents. The drugs may minimize spasm within the lower respiratory tract and cyanosis with consequent cardiac inefficiency, effects associated with the use of d-tubocurarine and cyclopropane. Supplementary diphenhydramine hydrochloride may be given intravenously during a prolonged operation, but this agent is not so effective in the presence of histamine that has already been released. The use of tripelennamine hydrochloride intravenously is not advised because of its uncertain effect on the blood pressure. In addition to their antihistaminic effect, these drugs have a sedative action. They potentiate the action of barbiturates; further, they have a local anesthetic action which has not yet been fully investigated. The antihistaminics may well assume a prominent place in anesthesia of the future.

*Evaluation of Cardiac Function.*—Electrocardiographic Data: Having satisfied oneself regarding a patient's pulmonary function, the next step is to determine cardiac function. A preoperative electrocardiographic tracing is always valuable, and it is particularly so for patients giving a history of cardiac dysfunction. Old cardiac infarcts will give signs of their presence. The position of the pacemaker may be established, and degrees of cardiac irritability may be recognized. However, the electrocardiogram is not a sensitive method of evaluating cardiovascular function. Recent preliminary studies at Hartford Hospital employing the electronic heart sound meter developed by Foulger and associates [6] have revealed variations in cardiac output and particularly in total peripheral resistance in anesthetized patients. These observations may be of importance in assessing the condition of patients before, during and after the administration of anesthetics. Preliminary data seem to indicate that an important problem in anesthesia will be development of ways and means to maintain total peripheral resistance within normal limits. This work is continuing.

### ADMINISTRATION OF THE ANESTHETIC

*Indications for Preliminary Medication.*—It is advisable that all patients who are about to undergo major intrathoracic surgical procedures, where reflexes involving the heart may be overactively stimulated, have an electrocardiogram recorded preoperatively. Agents are known which reduce cardiac irritability, and the anesthetist should be forewarned to employ them preoperatively and prophylactically during operation, otherwise even drastic methods of resuscitation may be of no avail should cardiovascular collapse occur. One does not need to stress the importance of atropine and scopolamine as agents for preliminary medication. Atropine is frequently to be preferred. The objective is to avoid production of excess mucus and at the same time to protect against occurrence of untoward vagus reflexes. Provision for sedation without depression of the vital centers is essential. For this purpose meperidine (demerol*) has proved efficacious. It is a satisfactory substitute in those persons who are sensitive to morphine. The over-all intent is to allay apprehension and fear and thus to minimize the production of epinephrine, which predisposes the heart to a rapid rate and irregular rhythm.

*Avoidance of Cardiac Irregularities.*—All anesthetic agents are capable of producing cardiac irregularities, though nitrous oxide (in the absence of hypoxia) and ether are rightly regarded as the safest of all agents. The irregularities which are induced may range from an occasional extra systole to ventricular fibrillation. The latter until recently has been regarded as invariably fatal, but there are now well authenticated records [7] of recovery from this complication in cases in which appropriate treatment has been employed. Cyclopropane is responsible for the greatest number of these irregularities, but its virtue of potency, enabling it to be used with a high percentage of oxygen, and its freedom from irritability to the respiratory tract tend to make it the agent of choice for many operative procedures. Administration of quinidine twenty-four hours preoperatively, followed by a therapeutic dose one hour preoperatively, is claimed to protect patients from dangerous cardiac irregularities. Because quinidine sulfate may render a susceptible heart more irritable, thus predisposing it to ventricular fibrillation, it use should be undertaken cautiously. It has been found that during operation the addition of a small amount of ether to the anesthetic mixture will frequently cause the disappearance of cardiac irregularities that are present. The nature of this dampening effect of ether is unknown, but its action may be directly on the cardiac musculature. If the addition of ether to the mixture is undesirable or has proved ineffectual we then resort to other measures. Atropine given intravenously may immediately control cardiac irregularities by its blocking effect on the vagus nerve. Another agent at our command is procaine hydrochloride administered by the intravenous route. Five cubic centimeters of solution in 1 per cent concentration or 10 cc. of a 0.5 per cent concentration may be given rapidly to effect a return to normal rhythm. This is not advocated unless the patient is under general anesthesia. In the presence of cardiovascular collapse administration of procaine is a worth while procedure prior to making an incision in order to begin cardiac massage.

*Protective Administration of Procaine.*—Patients who are known or suspected to be suffering from heart disease with or without disturbance of rhythm may be protected from the deleterious effects of cyclopropane by the administration of procaine hydrochloride intravenously in the form of a continuous intravenous instillation throughout the operative procedure. One gram of procaine hydrochloride per hour may be given, using isotonic sodium chloride solution which contains the drug in from 0.2 to 0.5 per cent

6. Foulger, J. H.; Smith, P. E., Jr., and Fleming, A. J.: Cardiac Vibrational Intensity and Cardiac Output, Am. Heart J. **35**: 933, 1948.

7. Lampson, R. S.; Schafer, W. C., and Lincoln, J. R.: Acute Circulatory Arrest from Ventricular Fibrillation for Twenty-Seven Minutes, with Complete Recovery, J. A. M. A. **137**: 1575 (Aug. 28) 1948.

concentration. It is also used to depress vagus reflexes in patients undergoing major intrathoracic procedures, either cardiac or pulmonary. In these circumstances reflexes are less apt to be induced by the surgeon working in the neighborhood of the pericardium, roots of the great vessels or pulmonary hilum. Beck [8] and others have reported on the use of the drug to infiltrate the region of the hilum during pneumonectomy or lobectomy. By the instillation of procaine hydrochloride into the pericardial sac during major cardiac procedures untoward reflexes may be obtunded.

*The Balanced Form of Anesthesia.*—There has been an increasing tendency in recent years to use a balanced form of anesthesia. We no longer seek to rely on a single agent, endeavoring instead to achieve a harmonious balance which will produce the most satisfactory results for both surgeon and patient. One example of this is the use of thiopental sodium (pentothal sodium®) in 0.2 per cent solution by continuous intravenous drip to provide sedation during spinal anesthesia. Many patients express a desire to be asleep during their operation. A spinal anesthetic will provide satisfactory operative conditions for the surgeon. This combination will satisfy both. It prevents psychic trauma that the patient might suffer during operation and allows the surgeon, if necessary, to discuss the patient's condition freely. However, it should be emphasized that the patient is maintained in a light sleep and can usually be awakened easily. The nausea and vomiting that may accompany spinal anesthesia and may be occasioned by traction on the mesentery are prevented by this method. With elimination of nausea, drastic reduction of blood pressure is less likely to occur. If supplementary general anesthesia eventually proves necessary to provide relaxation, the transition from a light sleep to full anesthesia can easily be accomplished.

*Combined Methods of Anesthesia.*—Mention has been made of the intravenous administration of procaine to protect the cardiac mechanism. It has also been used in 1 per cent concentration to produce anesthesia in conjunction with thiopental administered through another vein. Fraser [9] has suggested a formula for mixing the two without precipitation. This combination has proved satisfactory for endoscopic procedures such as bronchoscopy or laryngoscopy. Preceding establishment of general anesthesia it is wise to anesthetize the larynx by topical application of cocaine hydrochloride or tetracaine hydrochloride in each pyriform fossa. Excellent suppression of the cough reflex and adequate relaxation of the masseter muscles are achieved by these combined methods. It is necessary to carefully balance the dose of procaine and thiopental. If too much procaine is given peripheral cyanosis in the nail beds will appear, and administration of oxygen fails to immediately rectify the situation. If too much thiopental is given respiratory depression will occur and the administration of oxygen will be necessary. Curare has been administered with thiopental for these same examinations but with less satisfaction, because these drugs combine to produce respiratory depression and the curare also may be responsible for bronchospasm. The method of using procaine and thiopental has been employed for production of anesthesia for thoracoplasty. Where the aerating surface of the lungs is seriously reduced care must be taken to avoid peripheral cyanosis and respiratory depression. It has been found that the administration of nitrous oxide and oxygen in equal concentrations with an adequate rate of flow makes it possible to minimize the dosage of anesthetic agents given intravenously. Patients are able to cough at the termination of the operation, and they awaken in a cooperative mood without the exhibition of respiratory depression, nausea or vomiting.

*Rapid Induction of Anesthesia with Curare.*—A word must be said about rapid induction of anesthesia, a subject dear to every surgeon. Baird and his co-workers [10] have shown that thiopental and curare form a synergistic combination which, in the absence of any contraindication, may be given intravenously. The mixture contains 5 units of d-tubocurarine and 25 mg. of thiopental sodium in each cubic centimeter of solution. With this combination, induction can be rapid and relaxation will be adequate to permit easy endotracheal intubation. The depth of respiration may be controlled by intermittent manual pressure on the breathing bag. A skilled and experienced anesthesiologist can cope with the bronchospasm that may supervene during induction or after intubation. Tidal exchange must be maintained at an adequate level. Adequate spontaneous respiration must be in evidence before the patient can be safely returned to his room. It is well to avoid the administration of d-tubocurarine for one-half hour prior to completion of the operation. If for any reason ether has been given during the procedure extreme care must be taken to minimize the dosage of curare because of a cumulative and synergistic effect between these two agents. It is true that induction can be rapid, at a price. If the operative time proves to be shorter than contemplated, delayed recovery of adequate spontaneous respiration may necessitate keeping the patient under direct observation in the operating room for a considerable period. Unless the operation is planned to take at least one-half hour the use of curare might well be avoided.

### POSTOPERATIVE CARE BY THE ANESTHESIOLOGIST

*The Recovery Room.*—The field of endeavor of the modern anesthesiologist extends well into the period of postoperative care. His work will be facilitated and the safety of the patient in this most dangerous of periods will be enhanced if a recovery room is maintained on the operating room floor. During World War II recovery wards were maintained for the sickest patients. Frequently patients were not moved to their own ward for two or three days. This system created difficulties in that the nurses had to be specialists in all types of care. There was a tendency toward confusion when surgeons representing several specialties were seeing and ordering for their respective patients in one ward. Economical employment of nursing personnel was effected. Equipment for treatment of emergencies was segregated to that area of the hospital for maximal utilization. In civilian life the advantages of the recovery ward can be retained and its disadvantages eliminated by having every patient routed through the recovery room on the operating floor. The room should be an open one, admitting all classes of patients. One bed or one crib is required for each operating room, to accommodate patients until such time as they have

8. Beck, C. S.: Chronic Cardiac Compression Produced by Contracture of Extrinsic Scars on the Heart, Mod. Con. Cardiovasc. Dis., 1939, vol. 8, no. 10.

9. Fraser, R. E., and Kraft, K.: Pentothal—Procaine Analgesia, Anesth. & Analg. 27:282, 1948.

10. Baird, J. W., Johnson, W. R., and VanBergen, F. H.: Pentothal—Curare Solution: A Preliminary Report and Analysis of Its Use in One Hundred and Sixty Cases, Anesthesiology 9:141, 1948.

recovered full voluntary control of their protective laryngeal reflexes and their airway. Shock may be treated by administration of appropriate fluids including isotonic sodium chloride solution, dextrose and blood. Nursing care can be provided by one especially trained nurse per four beds, provided that the services of a ward helper and an orderly are available on call. The senior anesthesiologist is available for supervision and consultation. Postoperative intrapharyngeal, endotracheal or endobronchial aspiration can be accomplished when necessary, and oxygen can be administered as required. After the first postoperative dose of sedative has been given, most patients are ready for transportation to their own wards in condition to be self sustaining. Thus, economical employment of personnel is achieved with advantage to the patients in terms of their well-being. The recovery room may be closed by 7 p. m. each day. This is a system that has worked exceedingly well in our experience.

*Postoperative Administration of Drugs.*—It is realized that the effective employment of morphine during the postoperative period must be balanced against the hazard of diminished respiratory exchange, atelectasis and addiction. Newer agents of merit are being synthesized and offered for clinical trial. Meperidine (demerol®) gained a place in medicine in that fashion. Methadone is gaining prominence as an agent for oral administration. The racemic form has now been separated into its dextrorotatory and levorotatory components. It has been determined that approximately 80 per cent of effective action resides in the levorotatory form. Its use for the mitigation of intractable pain has been satisfactory, particularly when muscular spasm has been vexatious and debilitating. In the presence of metastatic lesions of the neck the pain of swallowing has been effectively controlled. Patients with inoperable carcinoma have gained weight prior to the onset of the terminal phase of their disease. Patients have demanded continuation of administration of the drug because they got relief without production of nausea or somnolence. Studies of these and other agents of similar potentialities are continuing.

The use of procaine hydrochloride as a postoperative analgesic agent has not been confined to intravenous administration. The anesthesiologist has used his skill in regional anesthesia to perform intercostal block with procaine or procaine-in-oil in the relief of postoperative pain following upper abdominal and major intrathoracic surgical operations. This interruption of the pain pathways is sometimes effective in providing relief long after the effect of the anesthetic agent has worn off. Nerve block—particularly paravertebral—is frequently requested in cases of intractable pain as a diagnostic measure and as a means to estimate the efficacy of contemplated surgical treatment. Lumbar sympathetic block is frequently employed and is combined with cutaneous temperature tests and oscillometric readings in an assessment of the status of patients suffering from vascular insufficiency of the lower limbs and in treatment of thrombophlebitis. Stellate ganglion block is used in the treatment of cerebral vascular accidents or to relieve spasm of the arteries of the upper limb that may follow injuries about the elbow.

## STATUS OF THE ANESTHETIST

The various aspects of the anesthesiologist's work which have been presented indicate that he must have a wide knowledge of recent advances in pharmacology; in fact, that he must be a practicing pharmacologist. His interest in the ancillary services of anesthesiology (intravenous therapy, blood transfusion and inhalation therapy) tend to perpetuate this status. This position, which he should be prepared to fill, is a comprehensive one because of his contacts with programs for research carried on by pharmaceutical manufacturers on the one hand and departments of pharmacology in universities on the other. He represents an integrating link in the work of one group of scientists interested in fundamental principles and another group interested in their clinical application.

*In the Hospital.*—The present day status of anesthesiologists varies considerably in different parts of the country and may vary in separate hospitals in the same city. This lack of a norm for the specialty is due to the influence of many factors. A prime influence is the scarcity of trained personnel in relation to the demand that has developed since World War II. The demand reflects the regard which anesthesiologists won on the basis of services rendered during the conflict. In order to provide the greatest good to the greatest number, some anesthesiologists have accepted salaried positions in hospitals as chiefs of departments in which training of residents is emphasized. The trend has been accentuated by provisions in Blue Cross contracts which cover payment for services rendered by hospital employees only. Because of the type of work undertaken by anesthesiologists their contacts with patients are often nebulous and they remain anonymous. In many instances hospitals have seized on these circumstances to discourage and prevent private practice by the anesthesiologist and thereby to perpetuate an arrangement by which profits of departments of anesthesiology are diverted into the general fund of hospitals to reduce deficits. It is our claim that reduction and elimination of deficits is a responsibility of the citizens served in each community and that it is not the responsibility of one segment of the medical profession. As the demand for professional service grows and the number of trained personnel available grows the hovering cloud of hospital deficit financing becomes more and more ominous in relation to possible improvement in patient care. The chief of a department of anesthesia finds it impossible to attract permanent members to his staff at the salaries he can offer. Medical schools will be justified in continuing to neglect the teaching of fundamentals in anesthesiology because their students will reject selection of a specialty with such a circumscribed future. Rejection will be all the more likely when students realize that in many schools anesthesiology is organized, if at all, as a subsection of the department of surgery. In some centers the chief of anesthesiology is known as an assistant or associate professor of surgery. The department of anesthesia, although working in the closest cooperation with the departments of surgery and medicine, should not be subordinated to either. In the Veterans Administration, although equal financial opportunity is provided, administrative and clinical dictation of the chief surgeon has on occasion made the anesthesiologist's position untenable in certain hospitals. From the legal angle it should be more generally recognized that no two persons may combine or agree to prevent a third, the patient, from holding each of the two equally liable legally for his care, even when their services are rendered at the same time. Dictation by surgeons should

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be replaced by unhampered consultation, with decisions reached on purely clinical grounds.

*In Private Practice.*—More and more anesthesiologists are willing and anxious to emulate the example of their medical and surgical confrères by engaging in private practice. The trend is an excellent one that should be fostered; otherwise the thin edge of the wedge of institutionalized and ultimately socialized medicine will be driven deep enough to open a crevasse into which surgeons, obstetricians and internists will fall. The anesthesiologists will be at the bottom to break the fall, but it is doubtful whether our usual efforts at pain relief will be rendered wholeheartedly. Why not face the fact that Blue Cross plans providing medical coverage can and will stall medical progress with devastating effect if payment is made only to hospitals for services rendered by employees? An anesthesiologist, certified by the American Board, recently was forced after nine years of private practice to resign from the staff of a hospital in New Jersey because he refused the demand of the administrator that he accept a full time job on salary. The motive must have been profit for the hospital from medical practice. This is not an isolated incident.

### PARALLEL DEVELOPMENT OF ANESTHESIA AND SURGERY

The day is rapidly approaching when physicians will be expected to assume more than clinical responsibility for the hospital in which they work. They may be asked or even forced to assume financial responsibility, but it should not be to the extent that individual citizens or captains of industry are relieved of responsibility for an institution that is an asset to the community as a whole. Where such financial responsibility has been assumed, as it has been in the case of anesthesiologists working on salary, we are entitled to know the extent to which such support is provided and we should get credit for it in the eyes of our confrères. May we emphasize Dr. James R. Miller's admonition [11] in this regard. His position as a member of the Board of Trustees of the American Medical Association lends weight to his well considered opinion that every anesthesiologist should be a member of the professional staff of the hospital and that his relations to the hospital ideally should be on the same footing as those of other members of the staff. When he makes an agreement or renews one with a hospital he should have the benefit of advice and support of a prudential committee of the staff. This committee should consist of three senior influential members. If this committee functions properly the anesthesiologist will be protected and conditions of contract and policies that are established will have the support of members of the staff. This principle might well be applied for pathologists and radiologists also. A unified front within the medical profession could thus be established.

The future of anesthesiology is assured. Surgery has developed to the point where the lesion is no more important than the economy of each patient's organism as a whole. In the measure that operative procedures are assuming greater and greater magnitude the work of the anesthesiologist in maintaining the patient's economy as a whole assumes greater and greater importance. Progress in anesthesiology must continue to parallel that in surgery. It is hoped that more medical schools will recognize these parallels.

11. Miller, J. R.: The Relationship of the Anesthesiologist to the Hospital, J. A. M. A. **139**:9 (Jan. 1) 1949.

## THE CONTROL OF POLYCYTHEMIA BY MARROW INHIBITION

### A Ten Year Study on 172 Patients

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Polycythemia vera, first described by Vaquez in 1892 [1] and later by Osler,[2] has been considered a fatal disease with a relatively short duration of life after onset, although an unusually long duration has been observed in some cases. Lee states, "The prognosis is inevitably fatal, but it must be remembered that this is a chronic disease, the duration of which varies from several months to many years. In the true form of polycythemia, the usual duration even after diagnosis, which is usually not established for over a year, is a number of years." [3] Symptomatic relief and control of the hematologic picture have been possible in many patients by means of venesections, phenylhydrazine given orally or roentgen irradiation, but there has been reported no large series of patients treated and observed for a long period in which evidence has been presented that there has been satisfactory control of the disease and appreciable lengthening of life.

Richardson and Robbins [4] treated, since 1932, 28 patients with total body roentgen irradiation, and they concluded that their results show that their method of therapy is superior to venesection or phenylhydrazine therapy. In the 12 patients who died, the causes of death were: pulmonary disease not related to the polycythemia (2), carcinoma of the breast (1), uremia due to prostatic obstruction (1), arterial thromboses (6; 3 coronary, 2 cerebral and 1 cerebral, aortic and subclavicular), the primary disease (1) and pulmonary embolism (1). In a series reported by Tinney and his co-workers [5] there was definite evidence that 36 out of 163 patients survived more than five years after onset. Common causes of death have been thromboses [6] in various arteries or veins, hemorrhage, the development of leukemia or anemia and infectious, neoplastic or other intercurrent disease.

In the absence of methods for preventing the disease, one is forced to look for methods of keeping the num-

From the Division of Medical Physics and Donner Laboratory, University of California.

Based on a presentation before the annual meeting of the American College of Physicians, San Francisco, April 23, 1948. This work has been supported in part by the Henry Stevens Kierstead Memorial Fund for Medical Research and by the John and Mary R. Markle Foundation. During the past three years the $P^{32}$ used in these studies has been provided by the Atomic Energy Commission.

Various associates during the past ten years have observed and assisted in the care of these patients, particularly Drs. William B. Chew and Wallace Partch, who referred the first 2 patients for treatment, and Dr. R. V. A. Low-Beer; also Drs. Robert Austin, Nathaniel Berlin, Ezra Bridge, Bruce Brown, J. W. Carpender, Morris Dailey, R. Lowry Debost, William G. Donald Jr., Ellsworth Dougherty, Lowell Erf, Anne Goetsch, John Gofman, J. G. Hamilton, Louis Hempelman, Rex Huff, Douglas Lund, Herbert C. Moffitt Jr., Mortimer Moseley, Robert Rosenthal, Enrique Strajman, Louis R. Wasserman, John Weaver and Owen Williams. Drs. E. H. Huffman, Herdin B. Jones, Martin Kamen, E. Lilly, K. G. Scott and C. A. Tobias prepared the $P^{32}$ solutions, and Dr. William J. Kerr lent his interest and support. Finally, the continued interest in and support of this and numerous other biologic and medical investigations in the Radiation Laboratory by Prof. Ernest O. Lawrence have been invaluable.

1. Vaquez, M. H.: Concerning a Special Form of Cyanosis with Accompanying Excessive and Persistent Hyperglobulia, Compt. rend Soc. de biol. **44**:384, 1892.

2. Osler, W.: Chronic Cyanosis with Polycythemia and Enlarged Spleen: A New Clinical Entity, Am. J. M. Sc. **126**:187-201, 1903.

3. Lee, R. I.: A Case of Polycythemia Vera or Erythremia, M. Clin. North America **21-24**:369-374, 1937.

4. Richardson, W., and Robbins, L. L.: The Treatment of Polycythemia Vera by Spray Irradiation, New England J. Med. **238**:78-83 (Jan. 15) 1948.

5. Tinney, W. S.; Hall, B. E., and Gaffin, H. Z.: Prognosis of Polycythemia Vera, Proc. Staff Meet., Mayo Clin. **20**:306-310 (Aug. 22) 1945.

6. Norman, J. L., and Allen, E. V.: Vascular Complications of Polycythemia, Am. Heart J. **13**:257-274 (March) 1937.

ber of red blood cells normal or near normal. If this can be done, these patients are usually symptom free, and they may be less susceptible to thrombotic complications. In 1938, after extensive animal and clinical studies with radioactive phosphorus, it was found possible to give nonlethal doses of sodium radiophosphate

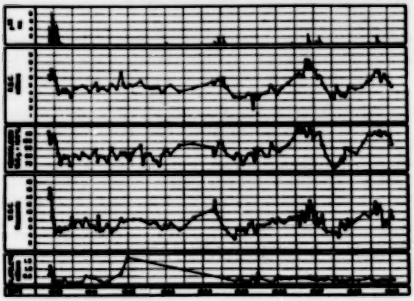

Fig. 1.—Hematologic course in a 42 year old woman with polycythemia vera treated with $P^{32}$. The blood picture has been controlled by the infrequent administration of radioactive phosphorus.

to animals and cause inhibition of cell production in the marrow.[7] The phosphate containing $P^{32}$ (half-life approximately 2 weeks) localized to a pronounced degree in bone, bone marrow and rapidly growing tissue such as leukemic tissue,[8] and it therefore seemed possible that one might have here a simple method for the inhibition of red cell production in polycythemia vera. Consequently we administered the material to 2 patients with polycythemia vera; their hematologic course since that time is shown in figures 1 and 2. These patients were reported in the original article.[9] The doses given were calculated and extrapolated after extensive experience with the effect of $P^{32}$ on the

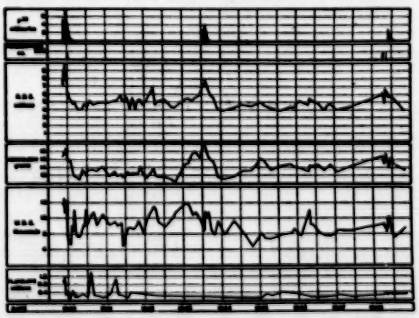

Fig. 2.—Hematologic course in a 37 year old woman with polycythemia vera treated with $P^{32}$. Figures 1 and 2 refer to the first two patients with polycythemia treated by this method.

7. Lawrence, J. H., and Scott, K. G.: Effect of Radio-Phosphorus on Blood of Monkeys, Proc. Soc. Exper. Biol. & Med. **40**: 155-158 (Oct.) 1941.

8. Lawrence, J. H.; Tuttle, L. W.; Scott, K. G., and Connor, C. L.: Studies on Neoplasms with the Aid of Radioactive Phosphorus: I. The Total Phosphorus Metabolism of Normal and Leukemic Mice, J. Clin. Investigation **19**: 267-271 (March) 1940.

9. Lawrence, J. H.: Nuclear Physics and Therapy: Preliminary Report on a New Method for the Treatment of Leukemia and Polycythemia, Radiology **34**: 51-60 (July) 1940.

hematopoietic tissues of animals and human beings.[10] It is seen that in both of these patients the number of red blood cells has been kept at normal or near normal levels with the infrequent use of $P^{32}$ and the symptoms and signs of the disease have likewise been controlled during this period of ten years.

Since the treatment of these first 2 patients we have treated in similar fashion 119 more patients suffering from polycythemia vera and have complete follow-up records on 116 of these patients. Figures 3, 4 and 5 are charts showing the hematologic courses in representative patients. Other investigators have confirmed our original observations that the symptoms and signs of the disease can be kept under control[11] with $P^{32}$, but the present paper is the first attempt to evaluate this new form of therapy with reference to life expectancy or prolongation of life. In the evaluation of any new therapeutic measure, relief of symptoms and signs and prolongation of life are the important criteria.

Since the beginning of this study of polycythemia, we have had the opportunity of carrying out numerous clinical and physiologic studies on 172 patients suffering

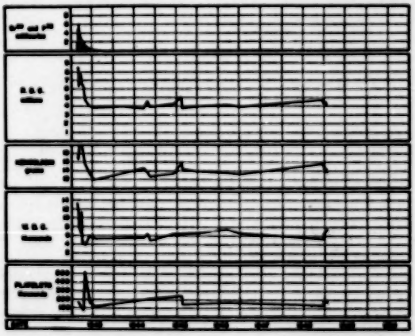

Fig. 3.—Hematologic course in a 58 year old woman with polycythemia vera treated with $P^{32}$. A single course of three doses of $P^{32}$ in 1943 has controlled the disease to the present (June 1949).

from polycythemia from various causes; 134 of them had the clinical and laboratory picture of polycythemia vera; 26 of them had mild polycythemia of unknown etiology and 12 had secondary polycythemia, usually associated with cardiac or pulmonary disease. There is no cleancut line between primary polycythemia and secondary polycythemia, although most patients with primary polycythemia do have the classic picture and most patients with secondary polycythemia have an obvious cause for the elevated red count, but there is a group of patients which seems to fall in between in which the question of anoxia arises, and one wonders whether an anoxic stimulus may not be a factor in all cases of polycythemia, whether they be of classic primary polycythemia vera or secondary cases such as those seen with heart and pulmonary disease. In this laboratory

10. Low-Beer, B. V. A.; Lawrence, J. H., and Stone, R. S.: The Therapeutic Use of Artificially Produced Radioactive Substances, Radiology **39**: 573-597 (Nov.) 1942.

11. (a) Warren, S.: The Therapeutic Use of Radioactive Phosphorus, Am. J. M. Sc. **209**: 701-711 (June) 1945. Reinhard, E. H.; Moore, C. V.; Bierbaum, O. S., and Moore, S.: Radioactive Phosphorus as a Therapeutic Agent, J. Lab. & Clin. Med. **31**: 107-218 (Feb.) 1946. (b) Hall, B. E.: Therapeutic Use of Radiophosphorus in Polycythemia Vera, Leukemia, and Allied Diseases, in The Use of Isotopes in Biology and Medicine, Madison, Wis., University of Wisconsin Press, 1948, p. 353. (c) Erf, L. A.: Radiophosphorus As Treatment of Choice in Primary Polycythemia, Am. J. Med. **1**: 362-366 (Oct.) 1946.

we have completed and have in progress numerous physiologic investigations directed toward the answer to this and other questions, which will be reported elsewhere.

The patients with polycythemia vera varied in ages from 19 to 75 years at the time of onset, with an average of 50.7 years (fig. 6). Of these, 56.5 per cent were male and 43.5 per cent female. In the entire group 85.6 per cent had received treatment previously with conventional methods, such as venesections, phenylhydrazine and/or roentgen ray. Palpably enlarged spleens were present in 65 per cent. After therapy the enlarged spleens became smaller or impalpable. Elevated white blood cell counts, above 10,000, were noted in 68 per cent, when first seen by us, and of those having an elevated white blood cell count, 38 per cent had myelocytes or immature white blood cells. This is of interest in view of the known relationship between polycythemia vera and leukemia and the frequent occurrence of leukemia as a complication of polycythemia vera.[12] Of those having immature white blood cells, 69 per cent had received previous therapy (phenylhydrazine, roentgen rays, phlebotomy). After therapy

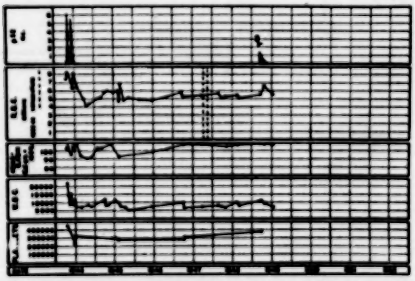

Fig. 4.—Hematologic course in a 47 year old man with polycythemia vera treated with $P^{32}$. $Y^{90}$ indicates the administration of radioactive yttrium colloid which localizes in the bone marrow, spleen and liver and provides beta irradiation with a half-life of about three days.

with $P^{32}$, immature white blood cells were found in only 27 per cent of those originally having immature cells. Five of 121 patients, or about 4 per cent of the total series (5 per cent of the group showing initial elevated white blood cell counts) showed myelocytes in the peripheral blood after $P^{32}$ therapy but not before. In no patient with a normal total white cell count when seen here initially were there myelocytes in the periph-

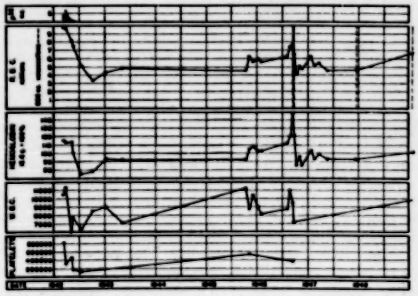

Fig. 5.—Hematologic course in a 53 year old man with polycythemia vera treated with $P^{32}$. No further $P^{32}$ has been needed since the first course in 1942.

eral blood. Thirty-three per cent had an elevated blood pressure, and 35 per cent of these had a fall of their elevated blood pressure after $P^{32}$ therapy. This is interesting in view of the possible relationship of the probably slowed renal blood flow and consequent renal hypoxia.[13] There was a peptic ulcer or a history of it in 11.5 per cent; 14.8 per cent had a thrombotic history.

The diagnosis of polycythemia vera was made from the history, physical examination and the laboratory findings, including sternal marrow examination (table) before and after therapy.[14] In connection with the marrow findings, it is interesting that there was an increased nucleated red cell count which returned to near normal or normal after therapy. When necessary, arterial blood oxygen saturation was done to rule out secondary polycythemia,[15] as were special pulmonary

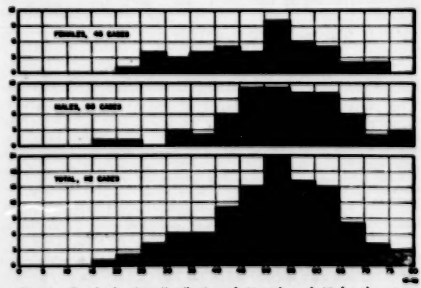


Fig. 6.—Graph showing distribution of 66 male and 46 female patients with polycythemia vera treated with $P^{32}$ according to age at onset (horizontal values). The vertical column of figures at the left shows the number of cases.

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and cardiac studies if indicated. The degree of unexplained polycythemia had to be 7,000,000 or above before the diagnosis was made, unless there was clear-cut evidence of the diagnosis in the past or an enlarged spleen with a definitely elevated red blood cell count. In borderline cases, the red cell mass as determined by $P^{32}$ labeled cells and the measurement of red cell production with $Fe^{59}$ were often helpful in diagnosis.

During 1939, 1940, 1941 and 1942, 30 patients were treated. Since that time this group of patients has received one course (usually two injections of 3 to 6 millicuries) on the average of every three years. In this series of 121 patients treated, 47.8 per cent received only one course of therapy, and, in the first group of 30 treated, 17 per cent had remained normal, at the time of reporting, for over three years after the single course of therapy. In the group treated during the first five years, 28 per cent have had only one course of therapy, some of them not needing retreatment after four, five, six, seven and eight years.

There have been 21 deaths. The causes of death have been: generalized arteriosclerosis (5), leukemia (5), neoplastic disease (3), coronary occlusion (3), cardiac failure (2), portal thrombosis (1), anemia and leukopenia (1) and cerebral thrombosis (1). Excluding the patient with portal thrombosis which had developed prior to our seeing or treating the patient, the average age of death in this series was 67.[16]

It is to be noted that there were 5 deaths associated with leukemia, or about 4 per cent of the treated group. The high incidence of leukemia as a complication of polycythemia vera is well known.[12] As pointed out by Moschcowitz,[12a] the transition of polycythemia vera into leukemia has been reported by many authors. Minot and Buckman,[12b] for example, have reported a series of 15 patients with polycythemia vera, in 3 of whom this complication developed. Likewise, Rosenthal [12c] reported such a case in which no therapy had been given prior to the development of leukemia.[17] Klumpp and Hertig [12d] have reported 5 cases in which myelogenous leukemia occurred as a complication of polycythemia vera. In 3 of these there had been no previous roentgen therapy or any other form of radiation. Hansen-Pruss and Goodman [12e] reported 2 patients with polycythemia vera under treatment with roentgen rays who died with the picture of acute leukemia. Kraus and Schiller [12f] reported a complicating leukemia in a patient with polycythemia vera. The patient had never received any form of radiation. Schoen [12g] has reported the development of leukemia in polycythemia vera apparently before any radiation therapy was given. Tinney, Hall and Giffin [12h] reported in a series of 163 patients with polycythemia vera that 17 per cent of them had a leukemic or leukemoid picture in their blood smears. Since these patients were under observation for a relatively short time and since the entire course of the disease was not completely followed, this figure would undoubtedly be higher if all the patients could have been studied over a period of many years for the development of this complication. During a relatively short period of observation of 14 patients with polycythemia vera by Tischendorf and Herzog,[12i] the complicating picture of myelogenous leukemia developed in 3. Two of these patients apparently had received previous roentgenologic treatment. Stealy and Sumerlin [12j] have written of a patient, untreated by roentgen or any other form of radiation but receiving prolonged treatment with phenylhydrazine, in whom there developed a terminal leukemoid reaction suggestive of leukemia. Hunter [12k] related that a patient with polycythemia vera died ten years after spray irradiation therapy of an acute, myeloblastic leukemia. Reifenstein [12l] has reported a case of polycythemia treated with Fowler's solution which terminated in subleukemic myelosis. In a series reported by Graham [12m] a leukemic picture developed in 24 per cent of the patients. Two cases of polycythemia vera untreated by radiation but with transition to acute myeloblastic leukemia have been reported by Herxheimer [12n] and Jung.[12o] Hall [11b] reported 4 deaths from acute leukemia in a series of 124 patients treated with radioactive phosphorus but no deaths from acute leukemia during the past three years in an increasingly large series of patients treated with $P^{32}$ (personal communication). McAlpin,[12p] Buchanan,[12q] von Winterfeld,[12r] Zimmermann,[12s] Stone and Woodman [12t] and numerous others have reported similar cases in which leukemia has developed prior to or after therapy with venesections, phenylhydrazine or roentgen ray.

*Average Differential Count of Sternal Marrow in 94 Cases of Polycythemia Vera (Pretreatment) and 20 Normal Subjects*

| | Polycythemia Vera (Percentage) | Normal (Percentage) |
|---|---|---|
| Myeloblasts | 0.86 | 2.2 |
| Neutrophil myelocytes | 24.0 | 20.5 |
| Eosinophil myelocytes | 0.5 | 1.6 |
| Basophil myelocytes | 0.03 | 0.04 |
| Nonsegmented polymorphonuclear cells | 18.9 | 24.3 |
| Segmented polymorphonuclear cells | 24.7 | 19.6 |
| Eosinophils | 1.0 | 0.8 |
| Basophils | 0.2 | 0.02 |
| Lymphocytes | 3.1 | 8.9 |
| Monocytes | 0.2 | 0.4 |
| Reticulum | 0.3 | 1.6 |
| Hematogones | 1.1 | 2.8 |
| Megaloblasts | 0.3 | 0.2 |
| Erythroblasts | 2.0 | 1.7 |
| Normoblasts | 22.5 | 15.0 |

Although there is no evidence of an increase in the complication in our series, this new form of treatment has not caused this serious complication to disappear. A brief analysis of the course of the 5 patients who died with leukemia or "leukemic-like" picture follows.

Patient F. M. died at age 63 after a ten year history of polycythemia. He was first seen by us five years after the onset of his disease. Prior to the beginning of $P^{32}$ therapy, he had been treated by venesections, and on one occasion, two years after the onset of polycythemia, he had a white count of 12,300, the differential showing a few immature forms. When he was first seen by us, the red cells numbered 8,970,000, white cells 27,950, platelets 807,300 and there were 1 per cent

16. Since the writing of this paper, there have been 3 more deaths, 1 from circulatory failure following widespread thromboses which had developed prior to $P^{32}$ and 2 from causes unknown, but none from leukemia or the disease itself.

17. Since this article was written, Dr. N. Rosenthal (personal communication to the author) has observed 7 more patients with polycythemia vera, untreated by any form of radiation, in whom there developed a leukemoid reaction or a leukemia as a complication. Two of these patients had a blood picture indistinguishable from that of chronic myelogenous leukemia. The following are the white cell counts and abnormal white cells in these patients:

| Patient | White Cell Count | Abnormal White Cells |
|---|---|---|
| 1 | 189,000 | 25% myelocytes |
| 2 | 53,600 | 1% myelocytes and 90% polymorphonuclear cells |
| 3 | 46,000 | 94% polymorphonuclear cells |
| 4 | 40,300 | 91% polymorphonuclear cells |
| 5 | 8,500 | 9% myelocytes |
| 6 | 60,000 | 2% myelocytes |
| 7 | 182,000 | 25% myelocytes |

In our own series of 172 patients, we also have 3 living patients with polycythemia complicated by a blood and marrow picture indistinguishable from chronic myelogenous leukemia (2 cases) and erythroleukemia (1 case). Two of these patients had received no previous roentgen radiation and none had received $P^{32}$. In the first 2 patients the myelogenous leukemic picture has been under excellent control for several years as the result of $P^{32}$ therapy.

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myelocytes in the blood smear. The first course of radioactive phosphorus (six doses totaling 20.3 millicuries) was given over a period of three months. The patient's red cell count returned to normal, and no immature forms were seen in the blood smear during the ensuing year. Then, occasional myelocytes were again observed. During the next four years the patient did well, but during the last two years of his life there was a definite and serious increase in the number of immature white cells. Two years prior to his death six doses of $P^{32}$ totaling 24.4 millicuries were administered. Nine months prior to his death, three doses of $P^{32}$ totaling 2 millicuries were given the patient. A blood count taken just before the patient's death showed 2,740,000 red cells and 68,000 white cells with 8 per cent myelocytes and 80 per cent myeloblasts.

Patient C. H. died at the age of 78 after a fifteen year history of polycythemia. Previous treatment included roentgen ray, phenylhydrazine, Fowler's solution and venesections. His blood picture when first seen by us showed 10,730,000 red blood cells, 17.7 Gm. hemoglobin, 480,000 platelets and 11,000 white blood cells but no abnormal cells. He was given 4.87 millicuries of radioactive phosphorus over a period of three weeks. The red blood cell count, hemoglobin and white blood cell count gradually fell, and no abnormal white cells were found in the blood smear. Approximately eighteen months later, an occasional myelocyte was noted in the blood smear and the red cell count had begun to rise. Six months later the patient was given two doses of 3 millicuries each of $P^{32}$. Immediately following this therapy the red blood count, hemoglobin, platelet count and white blood count gradually fell. A few weeks before the patient's death the blood picture showed 3,450,000 red cells, 55 per cent (8 Gm.) hemoglobin, 110,000 platelets and 4,000 white blood cells. Two days before his death, the peripheral blood smear showed 2,000,000 red blood cells, 42 per cent hemoglobin and 6,000 white blood cells with 25 per cent blast cells. The patient died with a terminal picture of subacute myelogenous leukemia. A postmortem examination revealed numerous erythroblasts, myeloblasts and megakaryocytes in the bone marrow, and zones of hemopoietic activity in the sinusoids of the liver. The pathologist's interpretation was myelogenous leukemoid reaction.

Patient L. W. died at age 68 of chronic myelogenous leukemia after a history of polycythemia for twelve years. Shortly after the onset of her disease she was treated by roentgen radiation and phenylhydrazine. Eight years later her white blood cell count was around 10,000, and on one occasion 2 per cent myelocytes were noted. Therapy with $P^{32}$ was started nine years after the onset of polycythemia, and during the period of a year three doses totaling 19 millicuries were administered. At one time during this period 3 per cent myelocytes were noted in the blood smear. Six months after the completion of $P^{32}$ therapy, 5 per cent metamyelocytes and 38 per cent myelocytes appeared in the blood smear, but the white cell count at this time was not elevated. The patient's course from this time until her death a little over a year later was steadily downhill with a rapidly developing anemia. Many myelocytes and blast cells terminally were found in the peripheral blood.

Patient M. M. was a man who died at age 62 after an eight year history of polycythemia never controlled by venesections. One year after onset, when he was first seen by us, his blood picture was: red blood cells 9,600,000, hemoglobin 24.8 Gm., platelets 1,190,000, white blood cells 13,050. He was given 7 millicuries of $P^{32}$ followed three weeks later by a second dose of 5 millicuries, and a satisfactory remission resulted. Two and one-half years later 1.18 millicuries of $P^{32}$ were administered because of a rising red cell count and hemoglobin level. A fourth dose of $P^{32}$ (5.35 millicuries) was given six months later when the red cell count rose to over 8,000,000 with 12,000 white cells. At this time, occasional metamyelocytes appeared in the peripheral blood smear. The patient remained in excellent remission for three more years. At the end of that time anemia and leukopenia developed. The blood picture a month before the patient's death was as follows: red cells 2,300,000, hemoglobin 37 per cent (5.92 Gm.), white blood cells 102,400 with many myelocytes and some myeloblasts. The platelets were seriously reduced, and the patient had grown progressively weaker. He died with a terminal subacute myelogenous leukemia. The bone marrow at autopsy showed well defined cellularity with complete replacement by leukemic cells.

Patient C. G. died at age 67, four years after treatment with $P^{32}$ and fifteen years after the onset of polycythemia vera. Previous treatments had included venesections, roentgen radiation and phenylhydrazine. When we first saw her, the red blood cells numbered over 10,000,000, but after a course of $P^{32}$ therapy, these were reduced to normal levels. The patient remained in remission until two years later, when there again developed an elevated red cell count (8,000,000) with approximately 20,000 white cells. No immature white cells were noted in the blood smear. Three doses of radioactive phosphorus totaling 9.98 millicuries were administered, but the red cell count remained around 8,000,000 and the white count around 20,000. One year later the red cell count was over 8,000,000 and the white cell count had risen to 44,000. The patient had two venesections at this time. Rare myelocytes and metamyelocytes began to appear in the blood smear for the first time. The red cells decreased to around 6,000,000. No further $P^{32}$ was given, but the white cell count continued to rise and continued to show rare myelocytes and a high percentage of polymorphonuclear cells until the time of the patient's death.

Thus, in summary, all 5 of these patients had typical polycythemia vera of relatively long duration. Four of them when first seen by us seemed to be candidates for the complication of leukemia because of evidence of a hyperactive marrow, as shown by the presence of young forms in the blood smear, and/or a high white blood cell count and high platelet count. The records of the original white cell counts of the fifth patient (C. G.) were lost.

Thus it appears that there is no significant increase in the incidence of leukemia after $P^{32}$ therapy. Also, the common leukemoid reaction seen at the outset of therapy disappeared in over 70 per cent of the cases after therapy with $P^{32}$. There is no evidence of the consistent occurrence of other complications which might be related to the treatment. For example, there is no evidence that neoplasms are being induced by this therapy: the three which we observed (carcinoma of head of pancreas, carcinoma of prostate and carcinoma of kidney) occurred soon after the beginning of therapy and probably were related to the normal probability of the development of neoplastic disease in patients in this age group.

Also of interest are the few thromboses observed after $P^{32}$ therapy in this series (4.2 per cent compared to over 25 per cent prior to $P^{32}$). Hall [11b] found in a series of 124 patients with polycythemia that there was a history of thrombosis in 27 per cent of them, whereas after $P^{32}$ therapy the incidence of thrombosis was only 2.4 per cent. This is probably related to the fact that the red cell mass, platelets and blood viscosity have been kept normal. With the present methods for the control of polycythemia and high incidence of serious thromboses in the past,[18] it cannot be emphasized too strongly that the numbers of the red cells and platelets of these patients should always be kept within normal limits in order to avoid damage to the vascular system. Such control of the red cell mass (as measured by accurate blood volume determinations) can be achieved only by adequate follow-up and frequent observation of all patients after they are treated. This applies particularly to patients in the older age group with high thrombocyte counts. Radiation is especially effective in controlling both of these formed elements of the blood. In this connection, it is of interest to observe

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that approximately 60 per cent of the patients had high platelet counts. In many of the patients treated with $P^{32}$ the condition was previously uncontrolled by venesections, and some patients treated only by venesections have shown a continued high red cell mass or a continued high red cell count with an abnormally low hemoglobin level after this form of therapy. In young patients with a normal platelet count and no tendency toward thromboses, a trial series of venesections is often performed, and a few patients can be controlled for longer or shorter periods of time in this way. During the early part of our work we did not combine venesections with $P^{32}$, but during recent years we have occasionally been carrying out a series of venesections prior to $P^{32}$ therapy and in some patients immediately after $P^{32}$, when we are reluctant to wait several weeks for the $P^{32}$ to take effect. Also, in some instances in which there has been a rise in the number of red cells several years after the first course of $P^{32}$, infrequent venesections have controlled a previously uncontrollable polycythemia. We have grouped our patients with polycythemia vera according to the method of treatment, as follows: 66 patients treated with $P^{32}$ only; 32 patients treated with $P^{32}$ followed within four months by venesections; 21 patients treated with $P^{32}$ followed more than four months later by venesections; 6 patients treated exclusively by venesections, and 9 patients treated and followed elsewhere. Finally, since patients with polycythemia vera are usually not in the child-bearing age group and since the doses of radiation are extremely small,[19] the possible genetic effects of irradiation on subsequent generations need not be considered.

Although this series must be extended in number and then followed for many more years, certain comments seem in order. First, the average age of onset of the patients is 50.7 years, and the average age of those patients who died was 67 years. This is nearly a normal life expectancy for persons in this age group.[20] It is of interest to compare leukemia, diabetes mellitus and pernicious anemia with polycythemia vera with respect to average age at onset and duration. In a study of diabetes Joslin and associates found that the duration was 14.1 years, with an average age at onset of 50.4 years and an average age at death of 64.5 years.[21] This latter age is in excellent agreement with the average age at death from diabetes computed from mortality statistics for the nation for the years 1940-1945.[22] Hardgrove and his co-workers [23] summarized the data for 80 patients with pernicious anemia who were living in 1944. The average age of onset of this group was 57 years, although this assumes certain average tendencies for age distribution, which is not specifically stated in their data in that the ages of onset are given in ten year intervals ranging from 25 through 79 years. Isaacs [24] in 580 cases found the peak of the age distribution for onset of symptoms to be 55 years. The average age at death of persons having pernicious anemia throughout the years 1940-1945 was 67.1 years as computed from vital statistics data.[22] Combining this with Hardgrove's data, one obtains an approximate average duration for pernicious anemia of ten years. The mortality of leukemia is on the rise.[25] The average age at death from all forms of leukemia for the years 1940-1945 is computed to be 44 years from vital statistics data,[21] and the average duration of life of chronic leukemia is about five years.[26]

It can be seen that at the present time patients with polycythemia vera properly treated have as favorable an outlook as do patients with diabetes mellitus treated with insulin or those with pernicious anemia treated with liver.

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## THE EFFECT OF ANTIHISTAMINIC DRUGS ON CONVULSIVE SEIZURES

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Certain antihistaminic drugs are analeptics and produce convulsions in animals. Although the dose required is about a hundred times that used clinically,[1] 1 case is on record in which fits were produced.[2] In a study of the effect of several antihistaminic agents on epileptic seizures, we have found that attacks could be evoked in some persons by doses even smaller than those generally used clinically. This observation deserves the consideration of physicians who are prescribing these drugs.

The study was undertaken to see if the common action of myanesin[3] (3-ortho-toloxy-1,2-propanediol), and diphenhydramine (benadryl[9]) [4] on parkinsonian tremor also applied to an action on convulsive manifestations. We had observed [5] from electroencephalographic records that the first drug abolished petit mal discharges but increased the discharges from focal lesions of the cerebral cortex. A similar study was therefore made of the action of diphenhydramine and tripelennamine (pyribenzamine[9]) on seizure cases. Intravenous tests were first employed with recording from frontal and in some cases additional leads.

### RESULTS OF INTRAVENOUS INJECTION

Diphenhydramine was given to 13 patients with petit mal, 3 of whom had the variant type of seizure (Lennox).[6] In 7 patients continuous recording was made; in others the spike-wave bursts were induced by hyperventilation, care being taken to assure uniformity of

breathing (tables 1 and 2). In these 13 patients, doses ranged from 30 to 125 mg. of diphenhydramine. Electroencephalographs of 10 patients showed a decided reduction of the spike-wave abnormality; in general, both frequency and length of the bursts decreased. In 1 instance (case 6) the abnormality completely disappeared for three hours. Both true and variant forms of petit mal were affected (figs. 1 and 2).

TABLE 1.—*Intravenous Injection of Diphenhydramine Hydrochloride or Tripelennamine Hydrochloride in Petit Mal*

| Case | Medication * | Mg. | Mean Time Spike Wave, Seconds | | Mean Time Hyperpnea, Seconds | | Trials | | Observation Time, Min. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Before | After | Before | After | Before | After | Before | After |
| 1 | D | 30 | 3.7 | 0.9 | 103 | 102 | 6 | 10 | 40 | 85 |
| 2 | D | 40 | 3.0 | 0.5 | 48 | 104 | 11 | 10 | 62 | 138 |
| 3 | D | 60 + 40 | 10.8 | 9.9 | 74 | 82 | 10 | 10 | 125 | 105 |
| 4 | D | 75 | 11.0 | 5.0 | 120 | 170 | 7 | 6 | 80 | 80 |
| | T | 35 | 10.0 | 11.00 | 88 | 124 | 7 | 4 | 105 | 60 |
| 5 | D | 75 | 20.0 | 7.0 | 70 | 120 | 11 | 20 | 75 | 170 |
| | D | 125 | 20.0 | 5.0 | 70 | 111 | 5 | 12 | 45 | 120 |
| | T | 75 | 19.0 | 14.0 | 60 | 60 | 3 | 12 | 15 | 70 |
| 6 | D | 50 | 10.0 | 1.0 | 130 | 180 | 14 | 8 | 80 | 65 |
| | D | 60 | 8.0 | 1.0 | 160 | 160 | 5 | 24 | 30 | 250 |
| | T | 25 | 8.0 | 42.00 | 120 | 55 | 5 | 3 | 44 | 61 |
| 7 | D | 60 | 48.0 | 24.0 | 111 | 111 | 8 | 13 | 63 | 114 |
| | D | 100 | 73.0 | 39.0 | 67 | 165 | 5 | 5 | 50 | 50 |
| | T | 60 | 60.0 | 55.0 | 59 | 61 | 5 | 8 | 63 | 95 |

* D stands for diphenhydramine hydrochloride; T, for tripelennamine hydrochloride.
† Many spontaneous bursts.

In sharp contrast to the effect in petit mal, administration of diphenhydramine increased the amplitude and frequency of the spikes in 2 cases of focal discharge. In 1 a motor convulsion followed.

Diphenhydramine therefore diminished the electrical abnormality in petit mal but increased it in focal cases. This action resembled results which were observed after myanesin[8] therapy.

TABLE 2.—*Intravenous Injection of Diphenhydramine Hydrochloride or Tripelennamine Hydrochloride in Convulsive Disorders*

| Case | Type * | Medication † | Mg. | Mean Time Abnormality, Seconds per Min. | | Observation Time, Min. | |
|---|---|---|---|---|---|---|---|
| | | | | Before | After | Before | After |
| 8 | T. P. M. | D | 25 | 10.00 | 2.0 | 22 | 31 |
| 9 | T. P. M. | D | 25 | 16.00 | 2.0 | 26 | 42 |
| 10 | T. P. M. | D | 40 | 2.20 | 2.9 | 60 | 17 |
| | | T | 20 | 5.00 | 47.02 | 45 | 10 |
| 11 | P. M. V. | D | 60 | 29.00 | 24.0 | 21 | 96 |
| 12 | P. M. V. | D | 60 | 37.00 | 9.0 | 28 | 72 |
| | | T | 40 | 33.00 | 60.0 | 16 | 28 |
| 13 | P. M. V. | D | 40 | 7.70 | 3.1 | 29 | 29 |
| | | T | 20 | 5.20 | 7.3 | 10 | 26 |
| 14 | F. F. | D | 30 | 0.32 | 13.4 | 27 | 45 |
| | | T | 30 | 0.01 | 51.02 | 14 | 17 |

* T. P. M. signifies true petit mal; P. M. V., petit mal variant; F. F., abnormal discharge, frontal focus.
† D stands for diphenhydramine hydrochloride and T for tripelennamine hydrochloride.
‡ Major seizures.

Tripelennamine was given to 7 patients with petit mal, and in 5 of these, in contrast to the effect of diphenhydramine, a distinct increase in the abnormality was observed (tables 1 and 2; fig. 3). In fact, a major grand mal seizure developed in 1 patient. The 2 patients whose seizures were uninfluenced were the only members of the group receiving anticonvulsant medication at the time. Furthermore, in 1 patient with focal discharge a jacksonian seizure was precipitated, and the clinical and electrical manifestations of a psychomotor attack developed in 1 patient after only 8 mg. of tripelennamine hydrochloride had been administered.

This drug therefore increased the abnormality in both petit mal and focal cases. The dosage employed was smaller than, or equal to, that of diphenhydramine: 8 to 75 mg. The result was noted after a delay up to ten minutes. In general the effect of these drugs could be noted for about an hour.

### RESULTS OF ORAL ADMINISTRATION

These drugs were then employed orally to see if the same effects could be maintained. The first results suggest, tentatively, that the effect observed after intravenous injection may be maintained by prolonged oral use (table 3).

Diphenhydramine hydrochloride in daily oral doses of 75 to 400 mg. was given to 12 subjects with true petit mal. Of the 12, 8 had fewer seizures while taking the drug. In 4 there was a remarkable reduction in the number of attacks.

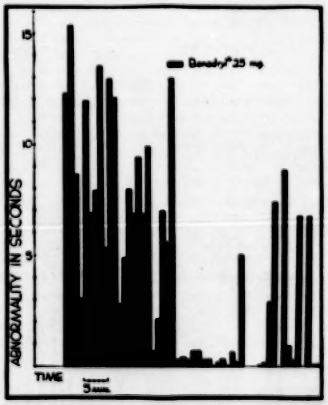


Fig. 1.—Effect of diphenhydramine (benadryl®) on electroencephalogram of true petit mal. The time occupied by spike and dome formations in each minute is indicated on the ordinate in seconds (continuous record before and after administration of 25 mg. of the drug intravenously).

Tripelennamine failed to effect improvement in the patients tested, and 1 patient had an increased frequency of generalized seizures. Four of the petit mal patients had infrequent motor seizures. They had major attacks so infrequently that the effect of diphenhydramine cannot be evaluated at this time.

Although this clinical material is small there is definite evidence that diphenhydramine has an effect on petit mal seizures which may have therapeutic value. A more precise estimate of its utility will require more time and case numbers. Tripelennamine therapy is contraindicated in petit mal, and both of these agents are contraindicated in cases of focal discharge. Before either is prescribed in seizure cases an analysis of the electroencephalograph should be made.

### COMMENT

The stimulating effect of diphenhydramine and tripelennamine on focal cortical discharges and of the latter on petit mal might result from a selective sensitivity

of epileptic persons, as has been observed with metrazol[8] (pentamethylene tetrazol) and other convulsants.

The antihistaminic action common to these drugs could not account for the opposite effects of diphenhydramine and tripelennamine. In addition to their antihistaminic action, the drugs also have an anti-

Jasper's studies[9] suggest that this discharge may arise from the reticular system of the thalamus, stimulation of which produces the typical electrical patterns and clinical fits. If the concept be correct, these drugs are affecting this system and probably other basal ganglions as well, as the effect on parkinsonism sug-

TABLE 3.—*Attacks per Eight Day Period Before and After Diphenhydramine and Tripelennamine Therapy*

| Case | Medication Continued * | Attacks Before † | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | None | P. M. 480 | D 75 mg. | | | | | | | | | | | | | |
| | | G. M. 0 | 121 | 18 | 1 | 5 | 0 | 5 | 6 | 11 | 5 | 5 | 0 | 1 | 3 | |
| 2 | None | P. M. 100 | D 100 mg. | | | | | | | | | | | | | |
| | | G. M. 0 | 10 | 1 | 0 | 0 | | | | | | | | | | |
| 3 | Pb. gr. ½ | P. M. 22 to 64 | D 100 mg. | | | | | | | | | | D 100 mg. | | | |
| | Dil. gr. 1½ | G. M. 0 | 31 | 17 | 0 | 2 | 7 | 2 | 16 | 2 | 4 | 61 | 4 | 0 | 0 | |
| 4 | Tri. gr. 25 | P. M. 22 to 64 | D 75 mg. | | | Tri. stop. | | D 200 mg. | | | (Tri. gr. 15) Tri. stop. | | | | | |
| | | G. M. 0 | 14 | 0 | 1 | 0 | 35 | 174 | 60 | 30 | 0 to period 18 | | | | | |
| 5 | None | P. M. 16 | T 75 mg. | | | D 75 mg. | | | | | | | | | | |
| | | G. M. 0 | 5 | 7 | | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 4 | 6 | | |
| 6 | None | P. M. 24 | T 100 | D 100 | | D 150 | | | | | | | | | | |
| | | G. M. 0 | 29 | 18 | 14 | 15 | 9 | 13 | | | | | | | | |
| 7 | Tri. gr. 15 | P. M. 80 | D 75 mg. | | | T 75 mg. | | D 150 | | | | | | | | |
| | | G. M. 0 | 21 | 13 | 7 | 22 | 22 | 17 | 30 | 26 | | | | | | |
| 8 | None | P. M. 100 | D 100 mg. | | | | | | | | | | | | | |
| | | G. M. 0 | 76 | 22 | 55 | 40 | | | | | | | | | | |
| 9 | "Mesantoin" Gr. ½; Pb. gr. 1 | P. M. 64 | D 75 | D 150 | | D 200 mg. | | "Mesantoin" and Pb. stopped | | | | | | | | |
| | | G. M. 1 a mo. | 30 | 9 | 16 | 6 | 8 | 5 | | | | | | | | |
| | | | 1 | 1 | 1 | 1 | 1 | | | | | | | | | |
| 10 | Pb. gr. 4; Tri. gr. 20 | P. M. 32 | T 125 | D 125 | | D 250 mg. | | | | | | | | | | |
| | | G. M. 1 a yr. | 24 | 27 | 18 | 25 | | | | | | | | | | |
| 11 | Dil. gr. 6 | P. M. 2 to 6 | D 100 | | | D 400 mg. | | | | | | | | | | |
| | | G. M. 1 a yr. | 1 | 4 | 2 | 2 | 4 | | | | | | | | | |
| 12 | Pb. gr. ¾ | P. M. 60 | | | | | | | | | | | | | | |
| | | G. M. 1 or 2 a mo. | D 75 | D 100 mg. | | | | | | | | | | | | |
| | | | 22 | 37 | 61 | 54 | | | | | | | | | | |

* Pb stands for phenobarbital sodium; Dil., for diphenylhydantoin sodium; Tri., for trimethadione.
† P. M. stands for petit mal; G. M., for grand mal; D, for diphenhydramine hydrochloride; T, for tripelennamine hydrochloride; Tri., for trimethadione.

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acetylcholine activity which is greater for the former than for the latter.[7] The results on petit mal therefore favor the drugs with this action,[8] but an antihumoral effect could scarcely account for the excitation of cortical discharge and the suppression of petit mal

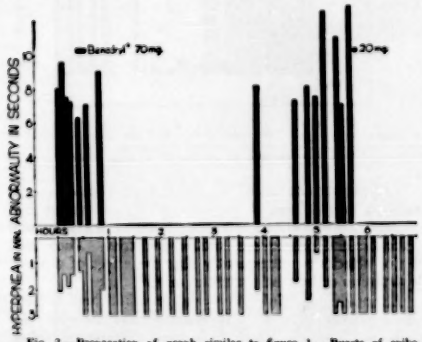


Fig. 2.—Preparation of graph similar to figure 1. Bursts of spike-dome waves were provoked by hyperpnea, duration of which is indicated below abscissa in minutes. Spike-wave forms were abolished for about three hours after administration of 20 mg. diphenhydramine hydrochloride (benadryl®) intravenously. After reappearance of spike-wave forms an additional injection of 20 mg. again abolished this activity.

spike-waves. The solution is more likely to be sought in interpreting the observation that diphenhydramine and tripelennamine act, though in opposite directions, on the mechanism responsible for petit mal discharge.

gests. If the effect of diphenhydramine depends on a depression of this region of the brain, the cortical firing might be the result of a release phenomenon, possible via the suppressor systems in this region of the brain. Perhaps the preliminary "quieting" of the record preceding an induced fit might be so interpreted. Thus a neuronal rather than a humoral cause may be sought to account for these observations.

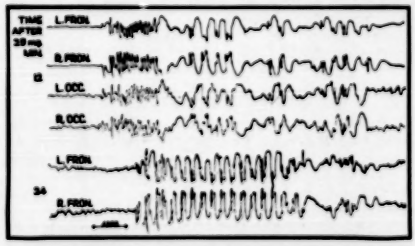


Fig. 3.—Electroencephalogram in petit mal (previous tracing normal). After 25 mg. tripelennamine hydrochloride (pyribenzamine®) was given intravenously spontaneous spike-wave bursts occurred. Twelve minutes after, clusters of spikes were seen. Spike-wave forms were still present twenty-four minutes after injection. The spikes reached 200 microvolts and the 3 per second slow waves 300 microvolts.

## SUMMARY

A study of the effect of two antihistaminic drugs, diphenhydramine (benadryl®) and tripelennamine (pyribenzamine®), in epileptic cases has shown that both are capable of inducing seizures in patients with

7. Loew, E. R.; Kaiser, M., and Anderson, M.: Federation Proc. 5:190, 1946. Loew, E. R.: Physiol. Rev. 27:542, 1947. Footnote 1.
8. Feldberg, W.: Physiol. Rev. 25:596, 1945.
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focal lesions of the cerebral cortex. Tripelennamine also increases petit mal seizures, but diphenhydramine has the opposite effect. This latter drug on oral administration has decreased the frequency of petit mal attacks. No claim is made for its place in the treatment of this condition at this time.

These agents must be used with care in treatment of patients with convulsive disorders, with the knowledge that they are capable of inducing seizures in such persons. This effect may find use in activating, or evoking, the abnormality in electroencephalographic tests.

3400 Spruce Street.

## Clinical Notes, Suggestions and New Instruments

### LOEFFLER'S SYNDROME

#### Occurrence in Two Patients Treated with Penicillin in Oil and Wax

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Transitory pulmonary infiltrations associated with eosinophilia of the peripheral blood has been described as an allergic reaction ocurring principally in persons with parasitic disease such as amebiasis, trichinosis, ascariasis and cutaneous helminthiasis.[1] This condition, usually referred to as Loeffler's syndrome, is somewhat variable in its course and severity, but is generally characterized by relatively mild clinical symptoms, which include fever, paroxysmal cough with sputum containing eosinophils, slight to moderate leukocytosis with eosinophilia and migratory pulmonary infiltrations evident roentgenographically.[2]

A plausible theory of the mechanism involved in Loeffler's syndrome is that the vascular system becomes hypersensitized to an extrinsic allergen and that the small blood vessels and capillaries of the lungs act as one of the shock structures. The damage to these vessels causes increased permeability of their walls, resulting in the pulmonary infiltrations.[3]

We have recently observed 2 paticuts with allergic reactions to penicillin in oil and wax, in whom there were transitory pulmonary infiltrations and peripheral eosinophilia.

#### REPORT OF CASES

CASE 1.—R. A., a 43 year old white woman, was first seen in the dermatology clinic on Jan. 27, 1948. She had florid secondary syphilis with lesions which were positive for Treponema pallidum on dark field examination. The result of serologic tests of the blood for syphilis were strongly positive with the Kolmer, Kline and Kahn (256 units) methods. Treatment was started on the day of examination. It was planned to administer an experimental outpatient schedule of 600,000 units of penicillin in oil and wax three times weekly for ten weeks.

Within two to three hours after the first P. O. B. injection the patient experienced rather severe chills and fever, followed by an exacerbation of all her cutaneous lesions. This reaction lasted less than twenty-four hours and was interpreted as of the Herxheimer type. The second injection of penicillin in oil and wax, on January 29, was well tolerated. However, after the third and fourth injections, on January 31 and February 2, respectively, the patient complained of soreness of the buttocks at the injection sites, leg pains and itching of the scalp along the hair line. After the fifth injection, on February 4, she experienced chills, fever, nausea and severe leg pains, but did not report to the clinic again until February 9. At that time a giant hive was noted at the site of the previous injection. Her temperature was over 100 F. She was advised to enter the hospital, but refused to do so until February 12. On admission her temperature was normal and the symptoms were subsiding except for the leg pains. It was decided to attempt to continue the penicillin therapy with coincident administration of diphenhydramine hydrochloride and aminophylline (hydryllin®) in a dose of 50 mg. every four hours. Within six hours after the next injection of penicillin in oil and wax, the patient again had chills, fever (temperature to 103 F.) and leg pains. The temperature returned to normal in twenty-eight hours, but the leg pains persisted.

The reaction to an intradermal test with 500 units of crystalline penicillin G in 0.1 cc. isotonic sodium chloride solution was negative in 20 minutes, 24 hours and 48 hours. A scratch test with peanuts (test material from Arlington Chemical Company) elicited a negative response. An intramuscular injection of 20,000 units of an aqueous solution of penicillin G was given without untoward reaction.

On February 16, after the temperature had remained normal for forty-eight hours, another injection of penicillin in oil and wax (300,000 units) was given. This was followed in about six hours by a recurrence of the symptoms described following previous injections of penicillin in oil and wax. There was tenderness of the anterior surface of the left thigh, most pronounced about the fossa ovale and extending to the knee. A consultant from the peripheral vascular disease section expressed the belief that this was due to thrombophlebitis and prescribed heparin and dicumarol.[4] The patient continued to have a high temperature along with the previously described symptoms. She also had rather extensive herpetic lesions about the lips and nares.

A blood cell count on February 14 showed hemoglobin, 75 per cent; neutrophils, 75 per cent; monocytes, 1 per cent, and lymphocytes, 23 per cent (the total white blood cell count was not reported). On the morning of February 16, prior to the injection of penicillin in oil and wax, a blood cell count was recorded: hemoglobin, 78 per cent; red blood cells, 4,000,000; white blood cells, 9,000; neutrophils, 84 per cent; eosinophils, 4 per cent; monocytes, 1 per cent, and lymphocytes, 11 per cent. However, on February 18, the white blood cell count was 14,900, with neutrophils, 50 per cent; eosinophils, 31 per cent; basophils, 1 per cent; monocytes, 5 per cent, and lymphocytes, 13 per cent. Subsequent blood cell counts revealed the following eosinophil counts: 44 per cent on February 21, 31 per cent on February 27 and 41 per cent on March 2.

A roentgenogram of the chest on February 16 showed decided accentuation of the pulmonary markings throughout both lung fields. There were no symptoms commensurate with these roentgen observations.

The results of urinalyses were negative. Results of other examinations, including stool studies for ova and parasites and agglutinations for typhoid H and O, paratyphoid A and B and Bacillus abortus, were negative.

The symptoms gradually subsided, and the patient became afebrile on February 20 (five days after the last injection of penicillin in oil and wax). A roentgenogram of the chest on February 25 showed almost complete clearing of the lung fields, and on March 18 the lungs were completely clear roentgenologically. The thrombophlebitis also resolved, and the patient was discharged on March 4 without further antisyphilitic treatment.

The patient was followed in the outpatient clinic and, as of the time of writing, had remained well. Results of serologic tests of the blood for syphilis were doubtful on March 23 and negative on April 23 and June 1, respectively.

CASE 2.—V. W., a 21 year old Negro woman, was first seen on May 24, 1948, when dark field positive condyloma lata of the vulva were discovered on examination. The result of the rest of the physical examination, including examination of

From the Institute for the Study of Venereal Disease, John H. Stokes, Director, and the Department of Dermatology & Syphilology of the Hospital of the University of Pennsylvania, Donald M. Pillsbury, Director.

1. Hodes, P. J., and Wood, F. C.: Eosinophilic Lung (Tropical Eosinophilia), Am. J. M. Sc. **210**: 288, 1945.
2. Loeffler's Syndrome, editorial, Internat. M. Digest **38**: 382, 1941. Transitory Pulmonary Infiltrations Associated with Eosinophilia Loeffler's Syndrome, editorial, J. A. M. A. **126**: 837 (Nov. 25) 1944.
3. Barden, R. P., and Cooper, D.: The Roentgen Appearance of the Chest in Diseases Affecting the Peripheral Vascular System of the Lung, Radiology **51**: 44, 1948.

the chest, were negative. The result of the serologic test of the blood for syphilis was strongly positive with the Kolmer, Kline and Kahn (256 units) methods. Treatment was begun on the day of examination; it was planned to give 600,000 units of penicillin in oil and wax daily (except Sundays) for fifteen injections. Except for a mild febrile Herxheimer reaction following the first injection, the patient experienced no untoward reactions. She failed to report for two of the scheduled injections on May 28 and May 31. On June 4, after the ninth injection, she experienced a rather severe frontal headache, fever and a nonproductive cough. She was admitted to the hospital the evening of June 5. On examination there was noted a generalized flush, temperature of 104 F., rapid shallow respirations, bronchovesicular breath sounds over portions of the lung fields and some crackling rales. Further studies revealed albuminuria (2 plus) and the following blood cell count: hemoglobin, 75 per cent and white blood cells 12,000, with 74 per cent neutrophils, 4 per cent eosinophils, 5 per cent monocytes and 17 per cent lymphocytes.

A roentgenogram of the chest was taken on the second hospital day (June 6). There was a rather diffuse patchy infiltration throughout both lung fields, which in the opinion of the roentgenologist was due to some type of chronic inflammatory disease.

Smears and cultures of sputum and gastric washings were negative for acid-fast bacilli. The result of a heterophil antibody test was negative. The electrocardiogram was normal except for sinus tachycardia (110) which could be explained by the high temperature.

Urinalysis on June 8 gave negative results. A blood cell count on June 10 showed 8,000 white blood cells with 15 per cent eosinophils. On June 12 the white blood cell count was 10,000 with 21 per cent eosinophils. On June 15 the white blood cell count was 8,400 with 37 per cent eosinophils.

The patient improved rapidly with symptomatic treatment—bed rest, forced fluids and 300 mg. of an antihistaminic preparation, tripelennamine hydrochloride (pyribenzamine®) daily. The temperature fluctuated between 101 and 104 F. for forty-eight hours after the patient's admission and then dropped precipitately to normal.

A roentgenogram of the chest was taken on June 11. The roentgenologist reported that since the previous examination (June 6) there had occurred decided diminution of the abnormal densities then present in lung fields. He stated that the rapid and almost complete clearing would lend strong support to the thought that this process was due to a hypersensitivity reaction. Another roentgenogram was taken on June 15, 1948, and the changes noted in the examination of June 6 had completely disappeared.

Prior to the patient's discharge, the reaction to an intradermal test with 200 units of penicillin G in isotonic sodium chloride solution (0.1 cc.) was completely negative. The result of an intradermal test with 0.05 cc. of penicillin in oil and wax was negative in 20 minutes, but produced a 1.5 cm. papule with surrounding erythema and edema of about 5 by 5 cm. in 24 hours.

The patient was discharged on June 15. No additional antisyphilitic treatment was given. At the time of last examination (July 20) she had remained asymptomatic. The white blood cell and differential counts had become normal. The reaction to the serologic test of the blood for syphilis remained positive.

### COMMENT

It is felt that these 2 cases are worthy of presentation since they represent an apparently unusual type of allergic reaction developing during treatment with penicillin in peanut oil-beeswax. They emphasize the ease with which allergic pulmonary involvement may be overlooked or dismissed by the physician as an infection of the upper part of the respiratory tract, virus pneumonia or influenza.

One patient (case 1) showed few symptoms or signs suggestive of pulmonary involvement, although she presented numerous other allergic phenomena. She was hospitalized because of leg pains, chills and fever during the course of treatment with penicillin in oil and wax. It was felt that penicillin therapy should be continued only with hospital supervision. The roentgenogram of the chest revealing the pulmonary involvement was one of the many studies performed because of the high eosinophil count in the peripheral blood.

The other patient (case 2) presented no detectable cutaneous or other localizing signs or symptoms suggestive of intolerance to penicillin in oil and wax and was hospitalized because of a nonproductive cough and a temperature of 104 F., which appeared to be out of proportion to her physical condition. It is to be noted that the first blood cell count revealed only slight eosinophilia, in spite of the extensive pulmonary involvement shown by roentgenologic examination.

Before the transitory nature of the pulmonary infiltrates could be established, other diagnoses were considered, such as, pulmonary oil embolism, virus pneumonia or observations of the chest representative of a chronic pulmonary infection. A reaction similar to the so-called ninth day erythema of the arsenical era was considered, but the only analogous features were the time of onset after the start of therapy and the eosinophilia.

Although the agent responsible for the allergic reactions was not conclusively proved, the negative reactions to the intradermal tests and the failure to exacerbate the process with intramuscular injections of aqueous penicillin G, plus the tuberculin type 24 and 48 hour reaction to 0.05 cc. of penicillin in oil and wax given intradermally (case 2), incriminate the beeswax. It is conceivable that a contaminant in the wax, such as a pollen, might have been the allergen.

### SUMMARY

Two patients who presented transitory pulmonary infiltrations and eosinophilia during the course of injections of penicillin in oil and wax for early syphilis are reported. Although not conclusively proved, the evidence pointed to the wax as the allergenic agent.

## REFRACTORY AMEBIC ABSCESS OF THE LIVER TREATED WITH CHLOROQUINE

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In 1948 Conan[1] reported 6 cases of hepatic amebiasis (without abscess of the liver) successfully treated with chloroquine. In the same year Murgatroyd and Kent[2] reported the cure of a case of refractory amebic abscess of the liver treated with chloroquine. The success of this treatment, after the failure of emetine, diiodo-hydroxyquinoline (diodoquine®) and penicillin given systemically and proflavine sulfate used locally, was striking. In 1949 Conan confirmed the efficacy of chloroquine against hepatic amebiasis (without abscess) with the report of several more cases in which it was used with success.[3]

The purpose of this article is to report a second case of refractory amebic abscess of the liver, which has been successfully treated by chloroquine, confirming the result reported by Murgatroyd and Kent.

### REPORT OF CASE

H. S., a white man aged 53, was admitted on Feb. 1, 1949 after transfer from another institution, where he had been hospitalized since September 1948 with a draining amebic abscess of the liver and an extensive, sloughing, necrotic ulcer involving skin and subcutaneous tissue of the midepigastrium. Emetine hydrochloride (2 grains [130 mg.] orally for several weeks at a time) penicillin, streptomycin and local irrigation of the wound and sinus were all unsuccessful in therapy. The patient had become anemic, had lost 30 pounds (13.6 Kg.) and had given up hope of life.

From the Department of Medicine, New York Hospital, and the Department of Public Health and Preventive Medicine, Cornell University Medical College.

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2. Murgatroyd, F., and Kent, R. P.: Refractory Amoebic Liver Abscess Treated by Chloroquine, Tr. Roy. Soc. Trop. Med. & Hyg. 42: 15, 1948.
3. Conan, N. J., Jr.: The Treatment of Hepatica Amebiasis with Chloroquine, Am. J. Med. 6: 309, 1949.

Physical examination at the time of admission revealed extreme pallor and emaciation. There was an ulcerative lesion in the midepigastrium 15 cm. long by 12 cm. wide, extending from just below the xiphoid process almost to the umbilicus. Its base was necrotic; the edges were raised, swollen and undermined by pockets of pus. At the superior pole of this lesion a sinus from which drained a chocolate-colored pus extended beneath the xiphoid process downward to the liver (fig. 1).

Actively motile amebas containing ingested red blood cells were demonstrated in the discharge from the sinus and in the pus from the pockets at the edges of the wound. Iron-hematoxylin stains confirmed the identification of Endomeba histolytica. Fixed and stained tissue sections taken downward through the edges of the wound revealed trophozoites with morphologic characteristics of histolytica. The complement fixation tests for amebiasis (performed by the National Institutes of Health) was positive.

The patient exhibited a mild fever (37.8 C., 99.6 F.) which subsided to normal levels twenty-four hours after admission and remained there. There were 3,000,000 erythrocytes with 10 Gm. of hemoglobin, and the white blood cell count was 28,000 with a shift to the right. Roentgen examination of the chest revealed clear pulmonary fields and costophrenic sulci and smooth diaphragmatic domes. An electrocardiogram was essentially normal.

Chloroquine diphosphate (aralen®) 0.5 Gm., was administered on the day of admission and 0.5 Gm. a day was given thereafter for ten days. On the fourth day of treatment the drainage from the sinus became negative for amebas and, except for a single organism observed on the seventh day, remained negative. Blood transfusions were given on the seventh and ninth days. A

Fig. 1.—Day after admission. Note the necrotic base of the ulcer, the raised and undermined edges. The draining sinus is obscured by sanguinopurulent material.

penicillin-resistant, hemolytic Staphylococcus aureus was cultured from the wound; hence, aureomycin was administered on the eighth, ninth and tenth days. The drainage from the sinus decreased in amount daily, ceasing entirely on the tenth day (fig. 2). On the twelfth day the dosage of chloroquine diphosphate was decreased to 0.25 Gm. a day until the twenty-first day, when it was discontinued entirely save for a weekly maintenance dose of 0.5 Gm. of the drug. The wound and sinus granulated in, and on the seventeenth day several small pinch grafts of skin were successfully applied. The patient gained weight and strength and was discharged on the thirty-first hospital day. Stool examinations were consistently negative for E. histolytica and have remained so during a follow-up period of two months.

Fig. 2.—Tenth hospital day. Note the clean granulation tissue, the absence of drainage from the sinus tract to the liver and recession of the wound edges.

Convalescence was uneventful. The patient returned to work and has remained free of symptoms since discharge, a period of eight weeks.

## COMMENT

That emetine hydrochloride alone is not an efficient amebacide is well established. For the treatment of acute dysenteric symptoms in amebiasis it is excellent, but it should then be followed by more specific drugs such as the oxyquinoline derivatives.[4]

Chloroquine, a drug of the 4-amino-quinoline series, used mainly as an antimalarial, exerts amebacidal activity against the trophozoites of E. histolytica both in vitro [2] and in vivo in the human being.[5] It is almost completely absorbed from the gastrointestinal tract and is localized in the liver of the rat in concentrations four hundred to six hundred times greater than those in the plasma.[6] It caused no significant toxic effects in a group receiving 0.5 Gm. of the drug a day for seventy-seven days followed by 0.5 Gm. a week thereafter for a year.[7]

The optimal dosage for the treatment of amebic hepatitis with or without the formation of abscess has not yet been determined. In the present case less than the usual dosage of 1 Gm. of chloroquine a day followed by 0.5 Gm. for two to three weeks was used. The patient exhibited no intolerance to the drug.

By utilization of the newer biologic technics it was possible to demonstrate that the hemolytic Staph. aureus for which the patient had been receiving penicillin was resistant to that drug but was sensitive to aureomycin. The cultures for this organism were positive until the cessation of drainage from the hepatic abscess.

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SUMMARY AND CONCLUSION

1. A case of amebic abscess of the liver was refractory to emetine therapy but was successfully treated by chloroquine diphosphate.

2. Advances in microbiologic technic have made possible more rational treatment of a secondary wound invader.

Since I submitted this report, another two months have elapsed and the patient has continued free of symptoms and with negative stools.

## TEMPORARY RELIEF OF ASTHMA BY JAUNDICE

### Report of Three Cases

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Cannon mentioned the word "Serendipity," which he attributed to Horace Walpole's story "The Three Princes of Serendip" (Ceylon). "As these princes traveled they were always making discoveries by accident or sagacity of things they were not in quest of." [1]

By chance, the observation was made that the development of jaundice in a patient with chronic intractable asthma was accompanied with dramatic relief of his symptoms. This striking coincidence suggested a possible causal relationship between jaundice and remission of asthmatic symptoms which has led to a search for other similar cases.

The relationship between jaundice and the relief of symptoms in rheumatoid arthritis has long been noted, and considerable literature has appeared, with speculation as to its cause.[2] It is probable that a similar relationship between asthma and jaundice has been noted clinically by allergists, but there are few references to it. Rackemann, in his annual review of the literature, remarked, "Jaundice relieves asthma while the jaundice is present and for some time afterward." [3] Other experienced allergists in personal discussions, have not noted this sequence. Boros [4] reported a case of a man, age 36, who had jaundice and ascites after taking an average of 10 pills of cinchophen a month for ten months for the relief of rheumatism of the right leg. With the appearance of jaundice, not only did his rheumatic pain stop but there was complete disappearance of ragweed hay fever and coincident asthma, allergic symptoms which had appeared regularly for the previous nine years. He made a complete recovery from the jaundice and hay fever. Six months later results of galactose tolerance and sulfobromophthalein sodium tests were negative and the following August he had no hay fever at all.

It has long been known that asthma is relieved during and for some time after fever. This fever may be the result of an acute infectious disease or induced by artificial means. Surgical operations often produce temporary relief. It is believed that the use of ether as an anesthetic may be the cause, but this will not explain the relief that has been seen after spinal anesthesia.

In this paper, 3 cases of chronic or intractable asthma are presented in which there was relief of asthma with the appearance of jaundice due to (1) infectious hepatitis, (2) presumable homologous serum hepatitis (jaundice) and (3) metastatic adenocarcinoma of the liver.

### REPORT OF CASES

CASE 1.—A white man, aged 50, had intractable asthma for twenty-four years. Reactions to skin tests with the ordinary food and inhalant allergens had been repeatedly negative. For the first few years he was treated by the usual method of hyposensitization without any benefit, and for many years he relied on small and frequent doses of epinephrine for relief. The only times when he had experienced real improvement were during four periods of about a month each, immediately after operations. Three of these were radical operations on the paranasal sinuses at the ages of 27, 32 and 33, because of roentgen findings of pansinusitis associated with the asthma. These operations were performed in an attempt to remove any foci of infection that were believed to cause his symptoms. There was another period of about four weeks' relief following an appendectomy for which spinal anesthesia was employed. For the seven or eight years prior to examination he had secured relief of symptoms only by the use of an average of eight to ten daily injections of epinephrine, 1:1,000, 0.3 cc., together with aminophylline, 100 mg., combined with ephedrine, 25 mg.

About July 1, 1947, vague gastrointestinal symptoms developed, and after a week it was noted that his urine had become darker and his stools lighter, together with the development of some tenderness over the liver. The scleras became yellow, and, finally, definite icterus of the skin appeared. With the onset of the initial gastrointestinal symptoms it was noted that the asthma had disappeared, and by the end of the first week there was no need for epinephrine at all. For a period of eight weeks thereafter he experienced practically no asthma, and during the next two weeks he required but one injection of epinephrine a day, usually on arising. The total period of relief was about ten weeks, the amelioration beginning before jaundice was observed clinically and at a time when his only symptoms were nausea and some abdominal distress. Unfortunately, the asthma subsequently recurred as heretofore. Tests of hepatic function were made rather late in the course of the disease. On September 5, these showed: thymol turbidity, 2.3 units; thymol flocculation, plus-minus; colloidal gold, plus-minus; cephalin cholesterol flocculation, plus-minus; 1 minute serum bilirubin, 0.67 mg. per hundred cubic centimeters; total serum bilirubin, 1.27 mg. per hundred cubic centimeters, and serum esterase, 120 millimoles per hour (normal values 150 to 250 millimoles per hour). Repeat tests on July 8, 1948, showed: thymol turbidity, 0.9 units; thymol flocculation, 0; 1 minute serum bilirubin, 0.14 mg. per hundred cubic centimeters, and total serum bilirubin, 0.25 mg. per hundred cubic centimeters.

CASE 2.[5]—The patient was a 27 year old white man who gave a family history of eczema from 7 weeks until 3 years of age. Milk was suspected as the cause, but no skin tests were done. A change to goat's milk gave relief. At the age of 9 years he first noted asthma on going into the barn and feeding the chickens. Skin tests at that time showed decided positive reactions to timothy, orchard grass and ragweed. In 1940 he joined the armed forces and for five years while overseas, in North Africa, Sicily, Italy, France, Germany and the British Isles, was completely free from allergic symptoms. From 1943 to 1945 he was wounded on several occasions and each time was given repeated transfusions of blood plasma. Four months after his return to his home intractable asthma developed. In August 1946, nine months after the last plasma infusion, severe hepatitis developed and he became immediately free from asthma, as he became icteric. His icteric index rose to 54, his albumin-globulin ratio was significantly altered, there was an increase in the bleeding and clotting time and his liver was decidedly enlarged. Recovery was slow with recurrences of jaundice on slight exertion. He was completely free from hay fever and asthma throughout the season. In May 1947 he went to Arizona and when last heard from, in December, was entirely free from symptoms of allergy as well as jaundice.

CASE 3.[6]—Mrs. F. first experienced asthma in April 1946, at the age of 56. The reactions to all skin tests were negative. Roentgenograms of the chest showed slight emphysema. From its onset asthma was severe and intractable. At the time of examination it had persisted constantly for two years, with no seasonal variation. She was treated with bacterial vaccines, potassium iodide, tedral® (contains ephedrine, phenobarbital and theophylline) and epinephrine. None of these remedies offered much relief. During the first week of February 1948, upper

From the Department of Pediatrics, Harvard Medical School, and The Children's Medical Center, Boston.

1. Cannon, W. B.: The Way of an Investigator, New York, W. W. Norton, 1945.

2. Hench, P. S.: The Advantages of Hepatic Injury and Jaundice in Certain Conditions, Notably the Rheumatic Diseases, Med. Clin. North America 24:1209-1238 (July) 1940.

3. Rackemann, F. M.: Allergy: A Review of the Literature of 1944 and 1945 with Comments on Future Problems, Arch. Int. Med. 77:700-719 (June) 1946.

4. Boros, E.: Hay Fever and Asthma During and After Jaundice, J. A. M. A. 109:113-115 (July 10) 1937.

5. From Dr. J. S. O'Toole, Potsdam, N. Y.

6. From Dr. Francis M. Rackemann. From the records of the Massachusetts General Hospital.

abdominal pain developed with nausea and constipation, followed a few days later by the appearance of jaundice. After the onset of the latter her asthma was decidedly improved and the asthma was milder than it had ever been since it first developed. Liver biopsy showed a metastatic adenocarcinoma. The primary site was undetermined.

COMMENT

In any chronic disease characterized by exacerbations and remissions and in which so many variable factors may play a part, some of which may be psychic, any claim to clinical relief must be accepted with considerable caution. I have presented 3 cases of intractable asthma in each of which the development of jaundice was associated with decided remission of symptoms. One can only speculate as to the cause of this and note the remarkable analogy between the relief obtained in cases of rheumatoid arthritis and that seen in chronic asthma. Also, in these two groups of devastating sickness there lie within the person certain reparative powers, the nature of which are as yet unknown, apparently released by alterations in hepatic function. The "reversibility" of disease processes that are frequently regarded as almost hopeless is of interest. The similarity of the relief obtained in these two groups of diseases immediately raises many questions as to their common denominator and as to the underlying mechanism for this dramatic change. Certainly, the observation calls for animal experimentation and further clinical study, both of which have already been started.

## THE ONE HOUR RAT OVARY HYPEREMIA PREGNANCY TEST WITH SYNERGIST

PAUL H. FRIED, M.D.
and
A. E. RAKOFF, M.D.
Philadelphia

Investigations by us to overcome certain disadvantages of the rat ovary hyperemia pregnancy tests led to our use of a pituitary synergist to improve the three hour test as a routine laboratory procedure[1] and to our present consideration of a one hour rapid rat pregnancy test for urgent cases. The one hour test is based on the augmentation by a pituitary extract of the rat ovary hyperemia response to chorionic gonadotropin; the latter is the basis of the rat ovary hyperemia reaction. In preliminary experiments it was found that the addition of the pituitary extract to a subminimal effective dosage[2] (0.7 international unit) of chorionic gonadotropin increased the percentage of positive reactions from 12.5 to 100 when tested at one hour.

PROCEDURE

The one hour rat ovary hyperemia pregnancy test with the addition of a pituitary extract was performed on each of 163 specimens sent to the Endocrine Division of the Jefferson Hospital Laboratories. The accuracy of the one hour rat test with and without the addition of the pituitary synergist was compared.

*Technic of the One Hour Rat Ovary Hyperemia Pregnancy Test with Pituitary Synergist.*—A subminimal ovary hyperemia dose, 0.06 units, of the pituitary synergist[3] was injected intraperitoneally in a single dose through the lower midabdomen of two 26 to 32 day old, 45 to 60 Gm. female albino rats of strain of an unknown identity. Two minutes later a single dose of 2 cc. of an unaltered urine, except for filtration if clouded, was injected in a similar fashion. The rats were asphyxiated with ether in one hour. Autopsy was performed about three minutes after the death of the animals with particular care to avoid hemorrhage and ovarian irritation. The ovaries were examined immediately. A satisfactory positive end point for the test reaction was the presence of one or more hyperemic ovaries, light to dark crimson in color, without regard to ovarian enlargement or follicular changes.

*One Hour Rat Ovary Hyperemia Pregnancy Test With and Without the Addition of 0.06 Units of Pituitary Synergist*

| Final Diagnoses | With Synergist | | Without Synergist | |
|---|---|---|---|---|
| | Positive | Negative | Positive | Negative |
| Normal pregnancy | 71 | 2 | 57 | 11 |
| Disturbed pregnancy | 29 | 2 | 15 | 16 |
| Not pregnant | 0 | 40 | 0 | 30 |

RESULTS AND COMMENT

The addition of the synergist[3] increased the percentage accuracy in all pregnancy cases from 71.2 to 96.4 and in normal pregnancy cases from 77.0 to 97.2 (see the accompanying table). There were no false positive results in nonpregnancy cases. There were 4 incorrect results among the 82 Friedman tests, the accuracy of which in all pregnancy cases was 94.5 per cent.

The rat ovary hyperemia pregnancy test, as a quick diagnostic procedure for pregnancy, attains its chief usefulness as an aid in the early detection of ectopic pregnancy. The one hour rat test with the addition of the pituitary synergist was performed in 70 suspected cases of ectopic pregnancy and was positive in the 12 actual cases of ectopic pregnancy, as proved by operation.

SUMMARY AND CONCLUSIONS

A one hour rat ovary hyperemia test for pregnancy utilizing a pituitary synergist to augment the reaction was tested. The over-all percentage accuracy of the rat test was 97.5 and of the Friedman test 95.1. The test is of particular value as an aid in the rapid diagnosis of ectopic pregnancy.

1812 Spruce Street (3) (Dr. Fried).

## SUCCESSFUL DESENSITIZATION TO PENICILLIN

FRANK GARAI, M.D.
New York

Penicillin is so widely used in antisyphilitic treatment that it is inevitable to have reactions occur in some instances. The Herish-Herxheimer reaction is negligible, especially if the penicillin is used at the beginning of treatment in small doses and if the patient has received some previous treatment with a bismuth compound. For the most part the reactions are allergic, usually so severe that penicillin therapy has to be discontinued.

REPORT OF CASE

H. J., a man aged 56, was married but had no children. Apparently he had been healthy all his life. The last serologic test for syphilis had been made thirty-five years ago and resulted negatively. The patient denied having had an initial lesion on the penis or any rash on his body. He had difficulty in breathing, had pain across the chest occasionally and tired easily. He appeared ill. Pulsations of the blood vessels in his neck were easily seen. Examination of the heart disclosed a diastolic murmur over the aorta. An electrocardiogram revealed aortitis. Reaction to the Wassermann test was 4 plus. The diagnosis was syphilitic aortitis, with latent tertiary syphilis.

In such cases it is not advisable to administer any form of arsenic therapy. Even with treatment for a long duration

From the Department of Obstetrics and Gynecology and the Endocrine Division of the Hospital Laboratories, Jefferson Medical College and Hospital.

1. Fried, P. H.: An Evaluation of the Two Hour Rat Test for Pregnancy, Am. J. Obst. & Gynec. 54:689-693 (Oct.) 1947; The Two Hour Pregnancy Test Based on Rat Ovary Hyperemia, West. J. Surg. 56:552-555 (Oct.) 1948. Rakoff, A. E., and Fried, P. H.: Enhancement of Effect of Chorionic Gonadotrophin on Ovarian Hyperemia in the Rat by Pituitary Extract, Proc. Soc. Exper. Biol. & Med. 68:491-492 (Oct.) 1947. Fried, P. H.: Factors Influencing the Rat Ovary Hyperemia Reaction as a Test for Pregnancy, Am. J. Obst. & Gynec. 57:868-877 (May) 1949. Fried, P. H., and Rakoff, A. E.: Improvement of the Rat Ovary Hyperemia Test for Pregnancy by Adding a Pituitary Synergist, J. Clin. Endocrinol., to be published.

2. The amount of chorionic gonadotropin that produced the rat ovary hyperemia reaction in approximately 75 per cent of 5 or more rats, was defined by us as the minimal effective dosage.

3. Dr. Erwin Schwenk of the Schering Corporation furnished the synergist, chiefly a follicle-stimulating gonadotropin with traces of the luteinizing principle, which was prepared from sheep pituitaries.

doubtful, the usual alternative is a bismuth compound given by injection to stop the acute symptoms.

Penicillin therapy was begun, 20,000 units of crystalline sodium penicillin G in sterile water being administered parenterally every three hours. On the second day a rash appeared on both thighs, which became pruritic and slightly bullous. The penicillin injections were stopped immediately, and antihistaminic drugs were given in large doses. The following day there developed an erythematous vesicular eruption on the upper and lower extremities of the patient and itchiness was severe. The patient received antihistaminic drugs, tripelenamine hydrochloride (pyribenzamine*) and pyranisamine maleate (neoantergan*) for two weeks. The rash slowly disappeared and the skin peeled off the affected areas.

Several skin tests were made with every available brand of sodium and potassium penicillin, 50 units each. In forty-eight hours every skin reaction was strongly positive. A trial was made of calcium penicillin, which is supposed to be painful on injection, but the patient had no more local pain at the site of injection than with the sodium or potassium penicillin. Finally, 50 units of calcium penicillin[1] was given intradermally into the skin on the upper part of the arm. No cutaneous sensitivity appeared. Because calcium penicillin was better tolerated than the other forms, the patient was desensitized successfully with larger and larger doses of the agent administered subcutaneously several times a day. After the dosage reached 10,000 units three time a day without reaction, the patient was given 100,000 units of calcium penicillin a day for two weeks in refracted doses of 20,000 units each. After that the patient improved considerably by clinical criteria. The symptoms of acute aortitis and pain across the chest subsided; the patient gained 16 pounds (7.3 Kg.) in body weight.

It is interesting to note that the patient had for a long time suffered with dermatophytosis on both feet. During the period of desensitization with calcium penicillin the infection on the feet was successfully cleared up with an ointment containing heptaldehyde.

When the calcium penicillin therapy was repeated three months later on the same patient, a skin test with calcium penicillin resulted negatively. With initial treatment consisting of 10,000 units of calcium penicillin administered three times a day, 100,000 units a day have been given in refracted doses for a two week period without any cutaneous or systemic reactions to the antibiotic.

SUMMARY

Successful desensitization to penicillin may easily be achieved with calcium penicillin in refracted doses.

102 East Sixty-Sixth Street (21).

1. Heyden Chemical Corp. is the distributor of the calcium penicillin that was used in experimental treatment.

**Auricular Fibrillation in Normal Hearts.**—That auricular fibrillation occurs in normal hearts has been proved repeatedly at post-mortem examination. Auricular fibrillation is a disturbance of auricular impulse formation and conduction that is a physiologic phenomenon and not a pathologic one. This was admirably demonstrated by Yater and summarized in his conclusion: "There is no pathologic change in the heart characteristic of auricular fibrillation." By direct intra-auricular measurements, Stewart, Crawford and Gilchrist showed that auricular fibrillation with a nearly regular rhythm did not diminish the rate of blood flow. Buchbinder and Sugarman demonstrated, by direct measurements, that the arterial blood pressure is constant in cases of auricular fibrillation with a nearly regular rhythm. Hence, in normal or controlled auricular fibrillation, the cardiac output and the rate of blood flow are not diminished and the blood pressure is constant, ensuring adequate tissue oxygenation and normal tissue metabolism. Since auricular fibrillation in normal hearts is characterized by its slow ventricular rate and negligible or absent deficit, it appears to be an efficient physiologic mechanism.—Hugh H. Hanson, M.D., and David I. Rutledge, M.D., Auricular Fibrillation in Normal Hearts, *The New England Journal of Medicine*, June 16, 1949.

## Council on Pharmacy and Chemistry

### REPORT OF THE COUNCIL

*The Council has authorized publication of the following report.* AUSTIN SMITH, M.D., *Secretary.*

### PRIMAQUINE GENERIC DESIGNATION FOR THE DRUG SN 13,272 (8-[4-AMINO-1-METHYLBUTYLAMINO]-6-METHOXYQUINOLINE)

The Malaria Study Section, Laboratory of Tropical Disease, National Institutes of Health, called the attention of the Council to the development of the drug known as SN 13,272, which is chemically (8-[4-amino-1-methylbutylamino]-6-methoxyquinoline) and suggested that a generic name be adopted for this compound. The section suggested the term "primaquine," to distinguish the compound from "pentaquine" and "isopentaquine."

The Council has voted to adopt "primaquine" as the generic name for (8-[4-amino-1-methylbutylamino]-6-methoxyquinoline).

### VISAMMIN AS GENERIC DESIGNATION FOR DIMETHOXY-METHYL-FURANO-CHROMOME

The Council's attention was drawn to the desirability of recognizing Visammin as the generic designation for Di-Methoxy-Methyl-Furano-Chromome, since Khellin has been sometimes used as a name for this drug. The term Khellin has been confused with Khellinin, which is the generic designation for Glucoside of Methoxy-Hydroxymethyl-Furano-Chromome. The brand of the latter is marketed by a firm which has proposed the protected name Mefurone for its product. No objection was made to the designation, and the Council voted to recognize the stated terminology as detailed in the heading of this report.

### ISOPROPYLARTERENOL HYDROCHLORIDE AND ISOPROPYLARTERENOL SULFATE GENERIC DESIGNATIONS RESPECTIVELY FOR ISUPREL HYDROCHLORIDE (Winthrop-Stearns, Inc.) AND ISONORIN SULFATE (Carroll Dunham Smith Pharmacal Co.).

The Council has accepted Isuprel Hydrochloride and has under consideration Isonorin Sulfate which are, respectively, hydrochloride and sulfate salts of the chemical 1-(3',4'-dihydroxy-phenyl)-2-isopropylaminoethanol.

In view of the fact that the parent compound of the drug is arterenol, the stated generic name is believed to be fitting since it accurately describes the chemical nature of the compound and indicates this relationship to the source.

### THIOMERIN PROTECTED NAME AND MERCAPTOMERIN GENERIC DESIGNATION FOR N-(GAMMA-CARBOXY-METHYLMERCAPTOMERCURI-BETA-METHOXY) PROPYL CAMPHORAMIC ACID.

The Council has recognized the protected designation "Thiomerin Sodium" for a brand of the disodium salt of N-(gamma-carboxy-methylmercaptomercuri-beta-methoxy) propyl camphoramic acid as presented by Campbell Products, Inc.

The Council also recognized the generic designation "Mercaptomerin Sodium" for this compound.

### PENTYLENETETRAZOLE GENERIC DESIGNATION FOR METRAZOL

The New and Nonofficial Remedies monograph for Metrazol has since its acceptance carried as a synonym the chemical name pentamethylenetetrazol. In accordance with its policy of adopting briefer generic terms suitable for use in prescriptions, the Council after extended consideration voted to recognize the term pentylenetetrazole as the generic name for this drug.

# MEDICAL EDUCATION IN THE UNITED STATES AND CANADA

## FORTY-NINTH ANNUAL REPORT ON MEDICAL EDUCATION IN THE UNITED STATES AND CANADA BY THE COUNCIL ON MEDICAL EDUCATION AND HOSPITALS OF THE AMERICAN MEDICAL ASSOCIATION

Donald G. Anderson, M.D., and Anne Tipner

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### Introduction

This report is the forty-ninth annual compilation of information and statistics on medical education in the United States and Canada by the Council on Medical Education and Hospitals of the American Medical Association.

The statistics concerning medical schools, students and graduates, which have been regular features of this report, are presented as in former years. This year for the first time certain statistical data have been analyzed on the basis of whether the schools are privately or publicly owned. A number of subjects of current interest and importance are also discussed, including the survey of medical education, the number of unfilled positions on the instructional staffs of the schools, the plans of medical students for future practice, the financial support of medical education, new medical schools, instruction in the clinical aspects of nuclear energy and the deferment of medical students under the Selective Service Act.

As in previous years, the report presents a summary of the postgraduate and continuation courses that were offered in the United States during the last year.

The list of hospitals approved by the Council for internships, residencies and fellowships was published in the Internship and Residency Number of THE JOURNAL (May 14, 1949). Hospitals that have been approved since the publication of that number are listed in this issue. As announced in the Internship and Residency Number, hospitals approved for residency training in surgery have been reappraised and a revised list of approved residencies is published in this issue on pages 48 to 51.

The current requirements of the various American Boards have been summarized. Several of the examining boards have revised their requirements since the 1948 Educational Number was published. The requirements of three boards organized and approved since the publication of the 1948 Educational Number are presented for the first time.

The data published in the Educational Number are obtained from official reports. The Council and THE JOURNAL express their appreciation to the officers of the medical schools, hospitals and other institutions and agencies whose cordial and continuing cooperation makes possible the compilation and presentation of this body of fundamental information which is consulted each year by many individuals, organizations and governmental agencies interested in medical education in the United States and Canada.

### Survey of Medical Education

During the past year plans were completed for the comprehensive survey of medical education in the United States to be conducted by the Committee for the Survey of Medical Education sponsored by the Council and the Association of American Medical Colleges. Dr. John E. Deitrick, associate professor of medicine, Cornell University Medical College, has been appointed director of the survey. Visits to the medical schools will begin in September 1949. This undertaking, the third major survey of medical education in the United States, should contribute significantly to the further development and progress of medical education.

One objective of the survey is to compile an accurate inventory of the present activities of the medical schools. Information of this type is constantly in demand, as evidenced by the number of questionnaires that are directed to the medical schools each year by individuals and organizations representing a wide variety of interests.

Important as will be the work of compiling detailed information concerning the medical schools, the major task of the survey will be to evaluate the adequacy of present day medical education, to draw attention to significant experiments and innovations, to point out deficiencies and to outline the path that medical edu-

TABLE 1.—*Approved Medical Schools in the United States*

| | Name and Location of School | 1939 Premedical Requirement in Years | Students by Classes 1948-1949 | | | | | | Graduates July 1, 1948 to June 30, 1949 | Executive Officer | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Freshman | Sophomore | Junior | Senior | Required Intern Year | Totals | | | |
| | **ALABAMA** | | | | | | | | | | |
| 1 | Medical College of Alabama, Birmingham | 3 | 52 | 52 | 51 | 31 | .. | 186 | 31 | Roy R. Kracke, M.D., Dean | 1 |
| | **ARKANSAS** | | | | | | | | | | |
| 2 | University of Arkansas School of Medicine, Little Rock | 3 | 92 | 86 | 71 | 54 | .. | 303 | 54 | (Henry Clay Chenault, M.D., Vice-President (William C. Langston, M.D., Acting Dean | 2 |
| | **CALIFORNIA** | | | | | | | | | | |
| 3 | University of California Medical School, Berkeley-San Francisco | 3 | 72 | 68 | 76 | 67 | .. | 283 | 65 | Francis Scott Smyth, M.D., Dean, San Francisco | 3 |
| 4 | College of Medical Evangelists, Loma Linda-Los Angeles | 4 | 97 | 77 | 79 | 74 | 85 | 327 | 85 | Harold Shryock, M.D., Dean, Loma Linda; Wm. F. Norwood, Ph.D., Dean, Los Angeles | 4 |
| 5 | University of Southern California School of Medicine, Los Angeles | 3 | 65 | 66 | 70 | 63 | 60 | 302 | 60 | Burrell O. Raulston, M.D., Dean | 5 |
| 6 | Stanford University School of Medicine, Stanford University-San Francisco | 3 | 61 | 60 | 59 | 60 | 59 | 242 | 59 | Loren R. Chandler, M.D., Dean | 6 |
| | **COLORADO** | | | | | | | | | | |
| 7 | University of Colorado School of Medicine, Denver | 3 | 64 | 57 | 71 | 59 | .. | 251 | 58 | Robert C. Lewis, Ph.D., Dean | 7 |
| | **CONNECTICUT** | | | | | | | | | | |
| 8 | Yale University School of Medicine, New Haven | 3 | 63 | 69 | 66 | 51 | .. | 251 | 47 | C. N. Hugh Long, M.D., Dean | 8 |
| | **DISTRICT OF COLUMBIA** | | | | | | | | | | |
| 9 | Georgetown University School of Medicine, Washington | Degree † | 120 | 111 | 85 | 73 | .. | 389 | 73 | Rev. Paul A. McNally, S.J., Ph.D., Dean | 9 |
| 10 | George Washington University School of Medicine, Washington | 3 | 92 | 81 | 78 | 69 | .. | 320 | 69 | Walter A. Bloedorn, M.D., Dean | 10 |
| 11 | Howard University College of Medicine, Washington | 2 | 74 | 72 | 64 | 65 | .. | 275 | 66 | Joseph L. Johnson, M.D., Dean | 11 |
| | **GEORGIA** | | | | | | | | | | |
| 12 | University of Georgia School of Medicine, Augusta | 3 | 80 | 77 | 77 | 68 | .. | 302 | 68 | G. Lombard Kelly, M.D., Dean | 12 |
| 13 | Emory University School of Medicine, Emory University | 3 | 73 | 63 | 56 | 40 | .. | 234 | 39 | R. Hugh Wood, M.D., Dean | 13 |
| | **ILLINOIS** | | | | | | | | | | |
| 14 | Chicago Medical School | 3 | 72 | 67 | 57 | 39 | .. | 235 | .. | John J. Sheinin, M.D., Dean | 14 |
| 15 | Northwestern University Medical School, Chicago | 3 | 126 | 125 | 142 | 130 | 132 | 525 | 130 | Richard H. Young, M.D., Dean | 15 |
| 16 | Stritch School of Medicine of Loyola University, Chicago | 3 | 90 | 81 | 69 | 55 | .. | 295 | 55 | James J. Smith, M.D., Dean | 16 |
| 17 | University of Chicago, The School of Medicine | 3 | 72 | 61 | 58 | 55 | .. | 246 | 55 | Lowell T. Coggeshall, M.D., Dean, Division of Biological Sciences; A. C. Bachmeyer, M.D., Assoc. Dean; F. J. Mullin, Ph.D., Dean of Students | 17 |
| 18 | University of Illinois College of Medicine, Chicago | 3 | 166 | 162 | 166 | 159 | .. | 653 | 158 | John B. Youmans, M.D., Dean | 18 |
| | **INDIANA** | | | | | | | | | | |
| 19 | Indiana University School of Medicine, Bloomington-Indianapolis | 3 | 150 | 112 | 95 | 81 | .. | 438 | 81 | John D. Van Nuys, Dean, Bloomington | 19 |
| | **IOWA** | | | | | | | | | | |
| 20 | State University of Iowa College of Medicine, Iowa City | 3 | 92 | 79 | 70 | 58 | .. | 299 | 58 | Robert T. Tidrick, M.D., Chairman, Executive Committee | 20 |
| | **KANSAS** | | | | | | | | | | |
| 21 | University of Kansas School of Medicine, Lawrence-Kansas City | 3 and Degree | 84 | 83 | 85 | 82 | .. | 334 | 82 | Franklin D. Murphy, M.D., Dean, Kansas City | 21 |
| | **KENTUCKY** | | | | | | | | | | |
| 22 | University of Louisville School of Medicine, Louisville | 2 | 96 | 94 | 90 | 82 | .. | 362 | 82 | J. Murray Kinsman, M.D., Dean | 22 |
| | **LOUISIANA** | | | | | | | | | | |
| 23 | Louisiana State University School of Medicine, New Orleans | 3 | 101 | 91 | 72 | 58 | .. | 322 | 58 | William W. Frye, M.D., Dean | 23 |
| 24 | Tulane University of Louisiana School of Medicine, New Orleans | 3 | 129 | 136 | 130 | 114 | .. | 409 | 114 | Maxwell E. Lapham, M.D., Dean | 24 |
| | **MARYLAND** | | | | | | | | | | |
| 25 | Johns Hopkins University School of Medicine, Baltimore | Degree | 79 | 69 | 73 | 72 | .. | 293 | 73 | Alan M. Chesney, M.D., Dean | 25 |
| 26 | University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore | 3 | 96 | 89 | 82 | 68 | .. | 337 | 69 | H. Boyd Wylie, M.D., Dean | 26 |
| | **MASSACHUSETTS** | | | | | | | | | | |
| 27 | Boston University School of Medicine, Boston | 3 | 71 | 58 | 56 | 52 | .. | 237 | 52 | James M. Faulkner, M.D., Dean | 27 |
| 28 | Harvard Medical School, Boston | 2 | 113 | 113 | 143 | 142 | .. | 511 | 141 | George Packer Berry, M.D., Dean | 28 |
| 29 | Tufts College Medical School, Boston | Degree | 111 | 98 | 97 | 84 | .. | 390 | 78 | Dwight O'Hara, M.D., Dean | 29 |
| | **MICHIGAN** | | | | | | | | | | |
| 30 | University of Michigan Medical School, Ann Arbor | 3 | 147 | 118 | 96 | 108 | .. | 469 | 107 | A. C. Furstenberg, M.D., Dean | 30 |
| 31 | Wayne University College of Medicine, Detroit | 3 | 68 | 65 | 57 | 37 | .. | 227 | 37 | Gordon H. Scott, Ph.D., Acting Dean | 31 |
| | **MINNESOTA** | | | | | | | | | | |
| 32 | University of Minnesota Medical School, Minneapolis | 3 | 125 | 122 | 95 | 84 | 122 | 426 | 124 | Harold S. Diehl, M.D., Dean of Medical Sciences | 32 |

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|---|---|---|---|---|---|---|---|---|---|---|
| **MISSOURI** | | | | | | | | | | |
| 33 St. Louis University School of Medicine, St. Louis | 3 | 123 | 113 | 105 | 90 | .. | 431 | 90 | Melvin A. Casberg, M.D., Dean | 33 |
| 34 Washington University School of Medicine, St. Louis | 3 | 86 | 83 | 86 | 96 | .. | 351 | 96 | Robert A. Moore, M.D., Dean | 34 |
| **NEBRASKA** | | | | | | | | | | |
| 35 Creighton University School of Medicine, Omaha | 3 | 75 | 69 | 64 | 40 | .. | 248 | 39 | Percy J. Carroll, M.D., Dean | 35 |
| 36 University of Nebraska College of Medicine, Omaha | 3 | 88 | 81 | 76 | 57 | .. | 302 | 56 | Harold C. Lueth, M.D., Dean | 36 |
| **NEW YORK** | | | | | | | | | | |
| 37 Albany Medical College, Albany | 3 | 50 | 45 | 50 | 41 | .. | 186 | 41 | R. S. Cunningham, M.D., Dean | 37 |
| 38 Long Island College of Medicine, Brooklyn | 3 | 113 | 105 | 97 | 101 | .. | 416 | 101 | Jean A. Curran, M.D., President; Duncan W. Clark, M.D., Dean | 38 |
| 39 University of Buffalo School of Medicine, Buffalo | 96 hrs. | 71 | 64 | 75 | 49 | .. | 259 | 49 | Stockton Kimball, M.D., Dean | 39 |
| 40 Columbia University College of Physicians and Surgeons, New York | 3 | 114 | 106 | 105 | 111 | .. | 436 | 108 | Willard C. Rappleye, M.D., Dean | 40 |
| 41 Cornell University Medical College, New York | 3 | 84 | 81 | 83 | 71 | .. | 319 | 69 | Joseph C. Hinsey, Ph.D., Dean | 41 |
| 42 New York Medical College, Flower and Fifth Avenue Hospitals, New York | 3 | 124 | 124 | 103 | 95 | .. | 446 | 95 | J. A. W. Hetrick, M.D., President and Dean | 42 |
| 43 New York University College of Medicine, New York | 3 | 128 | 120 | 118 | 112 | .. | 478 | 112 | Currier McEwen, M.D., Dean | 43 |
| 44 University of Rochester School of Medicine and Dentistry, Rochester | 3 | 68 | 64 | 68 | 68 | .. | 268 | 68 | George H. Whipple, M.D., Dean | 44 |
| 45 Syracuse University College of Medicine, Syracuse | 3 | 56 | 50 | 39 | 46 | .. | 191 | 46 | H. G. Weiskotten, M.D., Dean | 45 |
| **NORTH CAROLINA** | | | | | | | | | | |
| 46 Duke University School of Medicine, Durham | 3 | 76 | 70 | 69 | 62 | .. | 277 | 59 | Wilburt C. Davison, M.D., Dean | 46 |
| 47 Bowman Gray School of Medicine of Wake Forest College, Winston-Salem | 1 | 55 | 48 | 45 | 38 | .. | 186 | 38 | C. C. Carpenter, M.D., Dean | 47 |
| **OHIO** | | | | | | | | | | |
| 48 University of Cincinnati College of Medicine, Cincinnati | 1 | 90 | 81 | 77 | 79 | .. | 327 | 78 | Stanley Dorst, M.D., Dean | 48 |
| 49 Western Reserve University School of Medicine, Cleveland | 1 | 80 | 78 | 88 | 79 | .. | 325 | 75 | Joseph T. Wearn, M.D., Dean | 49 |
| 50 Ohio State University College of Medicine, Columbus | 1 | 86 | 78 | 72 | 84 | .. | 322 | 84* | Charles A. Doan, M.D., Dean | 50 |
| **OKLAHOMA** | | | | | | | | | | |
| 51 University of Oklahoma School of Medicine, Oklahoma City | 3 | 64 | 65 | 76 | 54 | .. | 259 | 54 | Mark H. Everett, Ph.D., Dean | 51 |
| **OREGON** | | | | | | | | | | |
| 52 University of Oregon Medical School, Portland | 3 | 76 | 74 | 64 | 59 | .. | 273 | 59 | D. W. E. Baird, M.D., Dean | 52 |
| **PENNSYLVANIA** | | | | | | | | | | |
| 53 Hahnemann Medical College and Hospital of Philadelphia | 3 | 105 | 90 | 73 | 98 | .. | 366 | 98 | Charles L. Brown, M.D., Dean | 53 |
| 54 Jefferson Medical College of Philadelphia | 3 | 166 | 162 | 156 | 151 | .. | 635 | 150 | William Harvey Perkins, M.D., Dean | 54 |
| 55 Temple University School of Medicine, Philadelphia | 3 | 137 | 119 | 107 | 98 | .. | 461 | 98 | William N. Parkinson, M.D., Dean | 55 |
| 56 University of Pennsylvania School of Medicine, Philadelphia | 3 | 126 | 109 | 117 | 122 | .. | 474 | 120 | John McK. Mitchell, M.D., Dean | 56 |
| 57 Woman's Medical College of Pennsylvania, Philadelphia | 3 | 50 | 44 | 36 | 31 | .. | 161 | 30 | Marion Fay, Ph.D., Dean | 57 |
| 58 University of Pittsburgh School of Medicine, Pittsburgh | 3 | 86 | 78 | 71 | 68 | .. | 303 | 68 | William S. McElroy, M.D., Dean | 58 |
| **SOUTH CAROLINA** | | | | | | | | | | |
| 59 Medical College of the State of South Carolina, Charleston | 3 | 60 | 57 | 57 | 42 | .. | 216 | 42 | Kenneth M. Lynch, M.D., Dean | 59 |
| **TENNESSEE** | | | | | | | | | | |
| 60 University of Tennessee College of Medicine, Memphis | 2 | 153 | 177 | 151 | 97 | .. | 578 | 112 | O. W. Hyman, Ph.D., Dean | 60 |
| 61 Meharry Medical College, Nashville | 2 | 69 | 56 | 63 | 43 | .. | 231 | 43 | Murray C. Brown, M.D., Director of Med. Education; Michael J. Bent, M.D., Dean | 61 |
| 62 Vanderbilt University School of Medicine, Nashville | Degree | 51 | 51 | 49 | 49 | .. | 200 | 47 | Ernest W. Goodpasture, M.D., Dean | 62 |
| **TEXAS** | | | | | | | | | | |
| 63 Southwestern Medical School of the University of Texas, Dallas | 3 | 64 | 58 | 60 | 56 | .. | 238 | 56 | W. Lee Hart, M.D., Dean | 63 |
| 64 University of Texas School of Medicine, Galveston | 3 | 110 | 97 | 98 | 69 | .. | 374 | 69 | Chauncey D. Leake, Ph.D., Vice Pres.; D. Bailey Calvin, Ph.D., Dean of Students and Curricular Affairs | 64 |
| 65 Baylor University College of Medicine, Houston | 3 | 91 | 76 | 77 | 62 | .. | 306 | 62 | W. H. Moursund, M.D., Dean | 65 |
| **UTAH** | | | | | | | | | | |
| 66 University of Utah School of Medicine, Salt Lake City | 128 qtr. hrs. | 52 | 52 | 50 | 40 | .. | 194 | 67* | H. L. Marshall, M.D., Acting Dean | 66 |
| **VERMONT** | | | | | | | | | | |
| 67 University of Vermont College of Medicine, Burlington | 3 | 40 | 36 | 37 | 35 | .. | 148 | 34 | William Eustis Brown, M.D., Dean | 67 |
| **VIRGINIA** | | | | | | | | | | |
| 68 University of Virginia Department of Medicine, Charlottesville | 3 | 74 | 68 | 64 | 56 | .. | 262 | 56 | Vernon W. Lippard, M.D., Dean | 68 |
| 69 Medical College of Virginia, Richmond | 3 | 84 | 76 | 98 | 68 | .. | 326 | 66 | Harvey B. Haag, M.D., Dean | 69 |
| **WISCONSIN** | | | | | | | | | | |
| 70 University of Wisconsin Medical School, Madison | 3 | 80 | 78 | 79 | 56 | .. | 293 | 56 | William S. Middleton, M.D., Dean | 70 |
| 71 Marquette University School of Medicine, Milwaukee | 3 | 100 | 102 | 93 | 82 | .. | 377 | 73 | John S. Hirschboeck, M.D., Dean | 71 |
| Totals | | 6,409 | 5,949 | 5,702 | 5,086 | 458 | 23,146 | 5,094 | | |

* Figures are for two graduating classes and include senior students reported in 1946 Educational Number. † Ninety semester hours for veterans. ‡ Intern enrolment not included in total column.

cation should follow in the years ahead to fulfil properly its responsibilities.

In last year's Educational Number, the broad objectives of the study were announced to be as follows:

To evaluate the present programs and determine the future responsibilities of medical education in its broadest aspects for the purpose of:

1. Improving medical education to better meet the over-all needs of the American people for:
   *a.* The prevention of disease.
   *b.* The restoration, so far as possible, to health of all those who suffer illness or injury.
   *c.* The maintenance of the best standards of physical and mental health of all the people.
2. Assessing the degree to which medical schools are meeting the needs of the country for physicians.
3. Promoting the advancement of knowledge in the field of medical science.
4. Better informing the public concerning the nature, content and purposes of medical education.

The study should encompass:

1. An inventory of the existing situation.
2. Determination of the need for changes and improvements.
3. Conclusions and recommendations based on the foregoing.
4. Proposals for ways and means of carrying out the recommendations.

Under the detailed plan worked out during the past year, the survey will concentrate on fourteen major aspects of the medical schools' activities:

1. The objectives of the medical school (for each of the various fields in which it is active)
2. Organization and administration
3. Physical facilities
4. Finances
5. Faculty
6. Student body
7. Curriculum and teaching methods
8. Research
9. Graduate training
10. Postgraduate training
11. Hospital relationships
12. Community relationships
13. Alumni activities
14. Plans for future development

During the next two academic years teams composed of two to three men will visit each medical school in the United States, spending approximately five to ten days at each school. At the conclusion of the field work a comprehensive report will be prepared and published.

The members of the Committee are President Alan Valentine of the University of Rochester, chairman, Drs. Arthur C. Bachmeyer, Herman G. Weiskotten, Joseph C. Hinsey, Victor Johnson, Dean F. Smiley and Donald G. Anderson, secretary.

### Approved Medical Schools

The seventy-one medical schools in the United States approved by the Council on Medical Education and Hospitals of the American Medical Association are shown in table 1, the nine Canadian schools in table 2 and the eight approved schools of the basic medical sciences in the United States and Canada in table 3.

Since the publication of the 1948 Educational Number, the Chicago Medical School has been added to the approved list and the Hahnemann Medical College has been removed from probation.

The approval of the Chicago Medical School applied to all students who were regularly enrolled in the first four years of the medical school course at the time the school was approved in November 1948. The approval did not apply to previous graduates or to students in the required intern year who had completed their formal training at the school prior to the date on which it was approved. The Chicago Medical School does not grant the degree of Doctor of Medicine until the completion of a year of internship. The first class to graduate as graduates of an approved school will be the one that graduates in the spring of 1950.

The basic science schools of North Dakota and South Dakota remain on probation.

Three medical schools formerly privately owned by nonprofit corporations are merging with state universities during the coming academic year. Syracuse University College of Medicine and the Long Island College of Medicine will become parts of the State University of New York. The Southwestern Medical College on September 1, 1949 became a branch of the University of Texas and changed its name to the Southwestern Medical School of the University of Texas. No change of name has been announced by either Syracuse or Long Island.

The merging of these three schools with state universities will reduce the number of medical schools owned by private nonprofit corporations from forty-four to forty-one and will increase the number of publicly owned schools from thirty-four to thirty-seven.

Tables 1, 2 and 3 list the quantitative premedical requirements effective next year for each school, the enrolment by classes for the academic year 1948-1949 and the total attendance exclusive of students in the required intern year. The number of graduates from July 1, 1948 to June 30, 1949 is also given for each school.

For the Canadian schools enrolments are also given for premedical students in the medical school as well as for students in a fifth medical year and the required intern year.

The name of the dean or executive officer is given for each school. Changes have been made in the executive officers of eleven of the eighty-eight medical and basic science schools in the United States and Canada since the publication of the 1948 Educational Number. The following schools have appointed new executive officers: Arkansas, Colorado, Northwestern, Iowa, Louisville, Louisiana, Harvard, Wayne, St. Louis, Utah and the University of Virginia.

### Medical School Calendars

This 1949 Educational Number presents data for the academic year beginning July 1, 1948 and ending June 30, 1949. During this period most schools followed conventional schedules with classes beginning in September or October and ending in May or June. The calendars of schools that present irregular schedules are summarized in table 4.

The freshman year in all schools except Utah began in either September of October. Utah admitted its freshman class in June. Tennessee admitted students quarterly. Only one school, Mississippi, admitted more than one freshman class. This school admitted classes in September and January.

The schedule for classes entering medical school in 1949 will be the same as that for the 1948 class except that Kansas is admitting its 1949 freshman class in June. One fifth of this class will not begin work until September under the plan of staggering the periods of instruction and vacation during the first year and a half of the medical school course.

Two schools graduated two classes during the academic year covered by this report. Ohio State graduated its last class on an accelerated program in December 1948 and graduated a second class on the conventional schedule in June 1949. Utah, although admitting

only one class a year, is continuing to offer an accelerated program on an optional basis. This school graduated one class in August 1948 and a second class in June 1949.

Irregular graduation dates were reported by five other schools. Northwestern, the University of Chicago, Minnesota and Tennessee graduated students quarterly. Bowman Gray completed its accelerated program by

### Graduates

The last columns of tables 2 and 3 give the number of graduates from each medical school in the United States and Canada respectively from July 1, 1948 to June 30, 1949. During this period, 5,094 physicians were graduated from medical schools in the United States and 679 from the schools in Canada. The total number of students and graduates in the United States

TABLE 2.—*Approved Medical Schools in Canada*

| | Name and Location of School | 1950 Premedical Requirement in Years | Students by Classes, 1948-1949: First Year Premedical | Second Year Premedical | Freshman | Sophomore | Junior | Senior | Additional Year | Required Intern Year | Totals* | Graduates July 1, 1948 to June 30, 1949 | Executive Officer | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ALBERTA | | | | | | | | | | | | | |
| 1 | University of Alberta Faculty of Medicine, Edmonton | 3 | .. | .. | 56 | 52 | 44 | 34 | .. | .. | 180 | 34 | John W. Scott, M.D., Dean | 1 |
| | MANITOBA | | | | | | | | | | | | | |
| 2 | University of Manitoba Faculty of Medicine, Winnipeg | 3 | .. | .. | 72 | 86 | 66 | 64 | .. | 59 | 288 | 59 | Alvin T. Mathers, M.D., Dean | 2 |
| | NOVA SCOTIA | | | | | | | | | | | | | |
| 3 | Dalhousie University Faculty of Medicine, Halifax | 2 | .. | .. | 58 | 54 | 57 | 46 | .. | 43 | 215 | 43 | H. G. Grant, M.D., Dean | 3 |
| | ONTARIO | | | | | | | | | | | | | |
| 4 | Queen's University Faculty of Medicine, Kingston | 1 | 62 | .. | 62 | 53 | 53 | 52 | 43 | .. | 325 | 43 | G. Spencer Melvin, M.D., Dean | 4 |
| 5 | University of Western Ontario Faculty of Medicine, London | 2 | .. | .. | 60 | 57 | 55 | 52 | .. | .. | 264 | 52 | J. B. Collip, M.D., Dean | 5 |
| 6 | University of Toronto Faculty of Medicine, Toronto | 2 | 150 | 140 | 191 | 157 | 169 | 157 | .. | .. | 964 | 154 | J. A. MacFarlane, M.B., Dean | 6 |
| | QUEBEC | | | | | | | | | | | | | |
| 7 | McGill University Faculty of Medicine, Montreal | 6 | .. | .. | 116 | 108 | 109 | 132 | .. | .. | 465 | 128 | Frederick Smith, M.D., Dean | 7 |
| 8 | University of Montreal Faculty of Medicine, Montreal | 1 | .. | .. | 122 | 97 | 98 | 82 | .. | 83 | 390 | 83 | Edmond Dubé, M.D., Dean | 8 |
| 9 | Laval University Faculty of Medicine, Quebec | Degree | .. | .. | 124 | 70 | 151 | 120 | 106 | .. | 563 | 83 | Charles Vézina, M.D., Dean | 9 |
| | Totals | | 712 | 140 | 855 | 734 | 842 | 729 | 149 | 185 | 3,671 | 679 | | |

* Intern enrolment not included in total column.

TABLE 3.—*Approved Schools of the Basic Medical Sciences in the United States and Canada*

| | Name and Location of School | 1950 Premedical Requirement in Years | Students by Classes, 1948-1949: Freshman | Sophomore | Total | Executive Officer | |
|---|---|---|---|---|---|---|---|
| | MISSISSIPPI | | | | | | |
| 1 | University of Mississippi School of Medicine, University | 3 | a [28 / 28 | 26 / 29 | 54 / 57 | David S. Pankratz, M.D., Dean | 1 |
| | MISSOURI | | | | | | |
| 2 | University of Missouri School of Medicine, Columbia | 3 | 47 | 40 | 87 | Trawick H. Stubbs, M.D., Dean | 2 |
| | NEW HAMPSHIRE | | | | | | |
| 3 | Dartmouth Medical School, Hanover | 3 | 24 | 22 | 46 | Rolf C. Syvertsen, M.D., Dean | 3 |
| | NORTH CAROLINA | | | | | | |
| 4 | University of North Carolina School of Medicine, Chapel Hill | 3 | 60 | 50 | 110 | W. Reece Berryhill, M.D., Dean | 4 |
| | NORTH DAKOTA | | | | | | |
| 5 | *University of North Dakota School of Medicine, Grand Forks | 3 | 30 | 28 | 58 | W. F. Potter, M.D., Dean | 5 |
| | SOUTH DAKOTA | | | | | | |
| 6 | *University of South Dakota School of Medical Sciences, Vermillion | 3 | 31 | 25 | 56 | Donald Slaughter, M.D., Dean | 6 |
| | WEST VIRGINIA | | | | | | |
| 7 | West Virginia University School of Medicine, Morgantown | 3 | 31 | 25 | 56 | Edward J. Van Liere, M.D., Dean | 7 |
| | CANADA | | | | | | |
| 8 | University of Saskatchewan School of Medical Sciences, Saskatoon | 2 | 32 | 31 | 63 | W. S. Lindsay, M.B., Dean | 8 |
| | Totals | | 311 | 276 | 587 | | |

a. Beginning date of additional freshman class January 3, 1949. * On probation.

graduating a class in December 1948. This school did not graduate a class in the spring of 1949. It will hold its next graduation in June 1950.

Except for the four schools that graduate students quarterly and the University of Utah which will graduate a few students on the accelerated program in September 1949, all schools will hold graduations in 1950 only in May and June.

During the past year all the Canadian schools followed regular schedules and will continue to do so for the coming academic year.

for each academic year since 1905 are reported in table 5.

As predicted in the 1948 Educational Number, the class of 1949 is the smallest graduating class in ten years. The small number of graduates is accounted for by the fact that when this class was admitted to the medical schools during the academic year 1945-1946, it was the smallest freshman class since 1940. This class was selected during the last year of the war when there was no provision for the deferment of premedical students by the Selective Service System.

As a consequence, medical schools were unable to find a sufficient number of qualified students to fill the available places in their freshman classes.

The enrolments in the senior class for 1949-1950 would indicate that there will be approximately 5,600 graduates in 1949-1950, which will be a larger graduating class than any except those that graduated in 1946 and 1947 at the culmination of the war time accelerated program when several schools graduated two classes in one year.

The schools with the largest number of graduates during 1948-1949 were Illinois 158, Jefferson 150, Harvard 141, and Northwestern 130. Sixteen schools graduated fewer than 50 students in one class. The schools with the smallest number of graduates in a single class were Woman's Medical 30, Utah 30, and Alabama 31.

In Canada, Toronto had the largest number of graduates, 154. Alberta with 34, Queen's with 43, and Dalhousie with 43 had the fewest graduates.

The total enrolment in the Canadian schools, including one basic science school, was 3,233, an increase of 133 over the preceding session. In addition there were 352 premedical and 149 fifth (not intern) year students in the Canadian schools. These students are included in the "total" column of table 2, but not in the total column of table 7.

There were 458 students in the required intern year in the United States and 185 in Canada. The total number of students in the United States taking a required intern year is shown in table 8 for each academic year since 1930-1931.

In table 9, the seventy-one medical schools of the United States are arranged in the order of the size of their student bodies. The median enrolment for these schools was 303, the average enrolment 313.

Five medical schools in the United States had more than 500 students, excluding those in the intern year.

TABLE 4.—*Admission and Graduation Calendars of Medical Schools with Irregular Schedules*

(Blank space indicates class is on regular schedule)

| | Dates of Freshman Classes Included in this Educational Number | Dates of Next Two Entering Classes | | Dates of Graduating Classes Included in this Educational Number | Dates of Next Two Graduating Classes | |
|---|---|---|---|---|---|---|
| | | 1949 | 1950 | | 1949 | 1950 |
| Northwestern University Medical School (Illinois) | — | — | — | Quarterly | Quarterly | Quarterly |
| University of Chicago School of Medicine | — | — | — | Quarterly | Quarterly | Quarterly |
| University of Kansas School of Medicine | — | June | June | June | — | June |
| University of Minnesota Medical School | — | — | — | Quarterly | Quarterly | Quarterly |
| University of Mississippi School of Medicine* | 9-20-48 | 9-5 | 1-30 | — | — | — |
| | 1- 3-49 | | | | | |
| Bowman Gray School of Medicine (North Carolina) | — | — | — | 12-19-48 | — | June |
| Ohio State University College of Medicine | — | — | — | 12-17-48 | — | June |
| | | | | 6-10-49 | | |
| University of Tennessee College of Medicine | Quarterly | Quarterly | Quarterly | Quarterly | Quarterly | Quarterly |
| University of Utah School of Medicine | 6-10-48 | June | June | Aug. 1948 | September | June |
| | | | | June 1949 | | |

* School of the Basic Medical Sciences.

Of the total of 5,773 graduates in the United States and Canada during 1948-1849, 48.3 per cent possessed a baccalaureate degree. The number and percentage of graduates with a baccalaureate from each medical school are shown in table 6.

### Enrolments 1948-1949

The total enrolment, excluding students taking a required intern year, in the seventy-one medical and seven basic science schools in the United States for the year 1948-1949 was 23,670. Although, as already pointed out, the graduating class was unusually small, the total enrolment was the fourth largest in American medical schools in modern years. The freshman class was the largest class ever admitted to the medical schools of the United States. Numbering 6,688 this class was 3 per cent larger than the 1947 freshman class.

The total enrolment for 1948-1949 represents an increase of 931 students, or 4.1 per cent, over the enrolment of the previous academic year and an increase of 2,143, or 10 per cent, over the average enrolment during the five year period 1937-1941 immediately preceding the war.

The enrolment figures for the academic year 1948-1949 for the individual schools are given in tables 1, 2, and 3. The total enrolments by classes in the medical and basic science schools in the United States and Canada are recapitulated in table 7.

Illinois with 653 students had the largest enrolment, Jefferson had 635, Tennessee 578, Northwestern 525 and Harvard 511.

Six schools had enrolments under 200. Vermont had 148 students, Woman's Medical 161, Alabama 186, Albany 186, Syracuse 191 and Utah 194.

In Canada, Toronto with 674 students had the largest enrolment. This figure does not include 290 students in the premedical years. The Canadian school having the smallest enrolment was Alberta with 180 students.

The total enrolment in the schools of the basic medical sciences in this country was 524. Mississippi with 111 students and North Carolina with 110 had the largest enrolments.

In table 10, the total enrolments in the various classes in the medical and basic science schools in the United States are recorded for each academic session since 1930-1931. During the 1948-1949 session there were 201 more freshmen, 436 more sophomores, 548 more juniors and 254 fewer seniors than were reported in 1947-1948.

It should be noted that prior to 1942-1943 the totals shown in table 10 are somewhat higher than the sum of the figures for the various classes in a given year. The discrepancy resulted from the inability of certain schools strictly to classify their students into the conventional graded classes.

### Distribution of Students by Sex

In table 11 the students enrolled in all the medical and basic science schools in the United States and Canada during the academic year 1948-1949 are classified according to sex. Graduates of the medical schools during the period July 1, 1948 to June 30, 1949 are also classified according to sex in the same table. In this period 612 women were graduated from the medical schools of the United States. The largest number graduated in any previous year was 392 in 1948. Table 12 shows the numbers and percentages of women medical students and graduates in the United States since 1905.

In 1948-1949 women totaled 2,109, or 8.9 per cent of the medical students in this country. The total is 50 less than for the preceding year, and the percentage represents a fall of 0.6 per cent. The percentage of women in the freshman class decreased from 7.9 per cent in the preceding year to 6 per cent. The actual number declined from 514 to 407.

Only three schools, Dartmouth, Jefferson and North Dakota had no women students. St. Louis admitted women students for the first time during 1948-1949. One school, the Woman's Medical College, had no men students.

The number of schools in addition to the Woman's Medical College enrolling more than 30 women students increased from twenty-four to twenty-six during the year 1948-1949. Five years ago only seven schools were in this category. From figures presently available it is estimated that about 6 per cent of the entering class in 1949 will be women.

In Canada women numbered 216, or 6.7 per cent of the total enrolment.

TABLE 5.—*Schools, Students and Graduates in the United States, 1905-1949*

Students in the required intern year are not included

| | Schools | Students * | Graduates |
|---|---|---|---|
| 1905 | 160 | 26,147 | 5,606 |
| 1910 | 131 | 21,526 | 4,440 |
| 1915 | 96 | 14,801 | 3,536 |
| 1920 | 85 | 13,798 | 3,047 |
| 1921 | 83 | 14,466 | 3,186 |
| 1922 | 81 | 15,635 | 2,959 |
| 1923 | 80 | 16,960 | 3,120 |
| 1924 | 79 | 17,738 | 3,502 |
| 1925 | 80 | 18,300 | 3,974 |
| 1926 | 79 | 18,840 | 3,962 |
| 1927 | 80 | 19,992 | 4,035 |
| 1928 | 80 | 20,545 | 4,302 |
| 1929 | 76 | 20,878 | 4,446 |
| 1930 | 76 | 21,267 | 4,565 |
| 1931 | 76 | 21,982 | 4,735 |
| 1932 | 76 | 22,135 | 4,708 |
| 1933 | 77 | 22,466 | 4,866 |
| 1934 | 77 | 22,709 | 5,025 |
| 1935 | 77 | 22,888 | 5,104 |
| 1936 | 77 | 22,564 | 5,182 |
| 1937 | 77 | 22,096 | 5,277 |
| 1938 | 77 | 21,567 | 5,194 |
| 1939 | 77 | 21,392 | 5,089 |
| 1940 | 77 | 21,271 | 5,007 |
| 1941 | 77 | 21,279 | 5,275 |
| 1942 | 77 | 22,031 | 5,162 |
| 1943 | 76 | 22,631 | 5,223 |
| 1944 | 77 | 23,529 | 5,134 |
| 1944 (second session) | 77 | 24,668 | 5,149 |
| 1945 (to June 30) | 77 | 24,028 | 5,136 |
| 1946 (to May 31) | 77 | 23,216 | 5,826 |
| 1947 (to June 30)† | 77 | 23,160 | 6,260 |
| 1948 (to June 30) | 77 | 22,720 | 5,543 |
| 1949 (to June 30) | 78 | 22,670 | 5,664 |

* Includes figures for schools of the basic medical sciences.
† Includes figures for additional classes.

### Veterans in Medical Schools

The percentage of veterans enrolled in the medical schools and schools of the basic medical sciences in the United States increased from 60.9 per cent in the preceding year to 65.8 per cent in 1948-1949. Of the total of 23,670 students 15,567 were veterans. Eighty-nine of the veterans were women.

TABLE 6.—*Graduates with Baccalaureate Degrees in Medical Schools in the United States and Canada, July 1, 1948 to June 30, 1949*

| | Graduates | Degrees | Per Cent with Degrees |
|---|---|---|---|
| Medical College of Alabama | 31 | 19 | 61.3 |
| University of Arkansas | 54 | 24 | 44.4 |
| University of California | 65 | 52 | 80.0 |
| College of Medical Evangelists | 85 | 35 | 41.2 |
| University of Southern California | 60 | 21 | 35.0 |
| Stanford University | 50 | 50 | 100.0 |
| University of Colorado | 58 | 34 | 58.6 |
| Yale University (Connecticut) | 47 | 28 | 59.6 |
| Georgetown University (D. C.) | 73 | 19 | 26.0 |
| George Washington University | 69 | 35 | 50.7 |
| Howard University | 66 | 49 | 74.2 |
| Emory University (Georgia) | 39 | 19 | 48.7 |
| University of Georgia | 68 | 22 | 32.3 |
| Northwestern University (Illinois) | 130 | 97 | 74.6 |
| Stritch School of Medicine | 53 | 20 | 37.7 |
| University of Chicago | 55 | 45 | 81.8 |
| University of Illinois | 136 | 141 | 80.2 |
| Indiana University | 81 | 59 | 72.8 |
| State University of Iowa | 58 | 17 | 29.3 |
| University of Kansas | 82 | 58 | 70.7 |
| University of Louisville (Kentucky) | 82 | 42 | 51.2 |
| Louisiana State University | 58 | 22 | 37.9 |
| Tulane University of Louisiana | 114 | 46 | 40.4 |
| Johns Hopkins University (Maryland) | 73 | 41 | 56.2 |
| University of Maryland | 69 | 25 | 83.5 |
| Boston University (Massachusetts) | 52 | 22 | 42.3 |
| Harvard Medical School | 141 | 61 | 43.3 |
| Tufts College Medical School | 78 | 40 | 51.3 |
| University of Michigan | 107 | 65 | 60.7 |
| Wayne University | 37 | 21 | 56.7 |
| University of Minnesota | 124 | 122 | 98.1 |
| St. Louis University (Missouri) | 90 | 27 | 30.0 |
| Washington University | 96 | 45 | 46.9 |
| Creighton University (Nebraska) | 39 | 17 | 43.6 |
| University of Nebraska | 58 | 35 | 60.3 |
| Albany Medical College (New York) | 41 | 12 | 29.6 |
| Long Island College of Medicine | 101 | 52 | 51.5 |
| University of Buffalo | 49 | 26 | 53.1 |
| Columbia University | 108 | 75 | 69.4 |
| Cornell University | 69 | 37 | 53.6 |
| New York Medical College | 95 | 48 | 50.5 |
| New York University | 112 | 63 | 56.2 |
| University of Rochester | 66 | 33 | 48.5 |
| Syracuse University | 46 | 27 | 58.7 |
| Duke University (North Carolina) | 59 | 19 | 32.2 |
| Bowman Gray School of Medicine | 38 | 17 | 44.7 |
| University of Cincinnati (Ohio) | 78 | 41 | 52.6 |
| Western Reserve University | 75 | 67 | 54.9 |
| Ohio State University | 84* | 61 | 72.6 |
| University of Oklahoma | 54 | 23 | 42.6 |
| University of Oregon | 59 | 59 | 100.0 |
| Hahnemann Med. College (Pennsylvania) | 98 | 54 | 55.1 |
| Jefferson Medical College | 150 | 72 | 48.0 |
| Temple University | 98 | 51 | 52.0 |
| University of Pennsylvania | 120 | 57 | 47.5 |
| Woman's Medical College | 30 | 29 | 96.7 |
| University of Pittsburgh | 68 | 50 | 73.5 |
| Medical College of South Carolina | 42 | 26 | 61.9 |
| University of Tennessee | 112 | 41 | 36.6 |
| Meharry Medical College | 43 | 34 | 79.1 |
| Vanderbilt University | 47 | 29 | 61.7 |
| Southwestern Medical School (Texas) | 56 | 26 | 46.4 |
| Baylor University | 62 | 14 | 22.6 |
| University of Texas | 69 | 23 | 33.3 |
| University of Utah | 67* | 53 | 79.1 |
| University of Vermont | 34 | 12 | 35.3 |
| Medical College of Virginia | 68 | 37 | 54.4 |
| University of Virginia | 56 | 25 | 44.6 |
| University of Wisconsin | 56 | 56 | 100.0 |
| Marquette University | 73 | 41 | 56.2 |
| University of Alberta (Canada) | 34 | 33 | 97.1 |
| University of Manitoba | 20 | 18 | 90.5 |
| Dalhousie University | 43 | 14 | 32.6 |
| Queen's University | 43 | 7 | 16.3 |
| University of Western Ontario | 52 | 16 | 30.8 |
| University of Toronto | 154 | 25 | 16.2 |
| McGill University | 128 | 103 | 80.5 |
| University of Montreal | 83 | 83 | 100.0 |
| Laval University | 83 | 73 | 88.0 |
| Totals | 5,773 | 3,187 | 48.3 |

* Includes two classes.

In table 13 the composition of the student body of the medical schools and schools of the basic medical sciences in this country is recapitulated by classes. Veterans comprised 70 per cent of the freshman class, a slight decline from the peak enrolment of 73.4 per cent veterans in the preceding freshman class. The

figure for veterans in other classes were sophomores 73.9 per cent, juniors 65.2 per cent and seniors 50.9 per cent.

### Geographic Source of Freshman Students 1948-1949

The residence of students in the 1948-1949 freshman class of each medical and basic science school in the United States and Canada is shown in table 14. It is recognized that the residence of certain students may be of brief duration, so that their real geographic source may not be revealed by their residence on entering medical school. On the other hand, the birth place of students is probably no better a criterion of geographic origin since appreciable numbers of persons have permanent residence elsewhere than in the states of the schools concerned. In general restrictions have been adopted as the result of direct or indirect pressure from the governmental agencies controlling the allocation of funds to the institutions. The most serious effect on medicine and medical education of such a policy is the fact that in several states superior out of state students are being denied admission in favor of less well qualified resident students. The consequence of this development is to lower the caliber and quality of the medical profession, particularly in the states that apply such restrictions.

In table 15 is shown the number of first year medical students from each state per hundred thousand inhabitants. For the nation as a whole there were 4.7 freshman medical students per hundred thousand inhabitants. The twelve states without medical or basic science schools had an average of 3.4 first year students per hundred thousand population. Those states with medical or basic science schools had an average

TABLE 7.—*Total Enrolments by Classes in Medical Schools of the United States and Canada for the 1948-1949 Session*

Students in the required intern year are not included.

| | Freshmen | Sophomores | Juniors | Seniors | Total | Total Preceding Session |
|---|---|---|---|---|---|---|
| 71 Medical Schools (U. S.) | 6,409 | 5,949 | 5,702 | 5,086 | 23,146 | 22,248 |
| 7 Basic Science Schools (U. S.) | 279 | 245 | ..... | ..... | 524 | 491 |
| Totals (U. S.) | 6,688 | 6,194 | 5,702 | 5,086 | 23,670 | 22,739 |
| 9 Medical Schools (Canada) | 855 | 734 | 842 | 739 | 3,170* | 3,043† |
| 1 Basic Science School (Canada) | 32 | 31 | ... | ... | 63 | 55 |
| Totals (Canada) | 887 | 765 | 842 | 739 | 3,233* | 3,104† |
| Grand Totals (U. S. and Canada) | 7,575 | 6,959 | 6,544 | 5,825 | 26,903 | 25,839 |

* Does not include 332 premedical and 149 fifth year students.
† Does not include 308 premedical and 84 fifth year students.

TABLE 8.—*Students in the Required Intern Year in the United States, 1931-1949*

| | |
|---|---|
| 1930-1931 | 1,025 |
| 1931-1932 | 1,067 |
| 1932-1933 | 1,106 |
| 1933-1934 | 1,183 |
| 1934-1935 | 1,253 |
| 1935-1936 | 1,213 |
| 1936-1937 | 1,255 |
| 1937-1938 | 1,132 |
| 1938-1939 | 1,152 |
| 1939-1940 | 1,152 |
| 1940-1941 | 1,058 |
| 1941-1942 | 767 |
| 1942-1943 | 639 |
| 1943-1944 | 451 |
| 1944 (Second session) | 447 |
| 1944-1945 | 452 |
| 1945-1946 | 488 |
| 1946-1947* | 582 |
| 1947-1948 | 447 |
| 1948-1949 | 458 |

* Includes additional class.

TABLE 9.—*Medical Schools of the United States in Order of Size of Total Enrolments for 1948-1949*

| | |
|---|---|
| University of Illinois | 633 |
| Jefferson Medical College | 625 |
| University of Tennessee | 579 |
| Northwestern University | 525 |
| Harvard Medical School | 511 |
| Tulane University | 499 |
| New York University | 478 |
| University of Pennsylvania | 474 |
| University of Michigan | 469 |
| Temple University | 461 |
| New York Medical College | 446 |
| Indiana University | 438 |
| Columbia University | 436 |
| St. Louis University | 431 |
| University of Minnesota | 426 |
| Long Island College of Medicine | 416 |
| Tufts College Medical School | 350 |
| Georgetown University | 389 |
| Marquette University | 377 |
| University of Texas | 374 |
| Hahnemann Medical College | 366 |
| University of Louisville | 362 |
| Washington University | 351 |
| University of Maryland | 337 |
| University of Kansas | 334 |
| College of Medical Evangelists | 327 |
| University of Cincinnati | 327 |
| Medical College of Virginia | 326 |
| Western Reserve University | 325 |
| Louisiana State University | 322 |
| Ohio State University | 322 |
| George Washington University | 320 |
| Cornell University | 319 |
| Baylor University | 305 |
| University of Arkansas | 303 |
| University of Pittsburgh | 303 |
| University of Georgia | 302 |
| University of Nebraska | 302 |
| State University of Iowa | 299 |
| Stritch School of Medicine | 295 |
| Johns Hopkins University | 291 |
| University of Wisconsin | 283 |
| University of California | 283 |
| Duke University | 277 |
| Howard University | 275 |
| University of Oregon | 273 |
| University of Rochester | 268 |
| University of Southern California | 262 |
| University of Virginia | 262 |
| University of Buffalo | 259 |
| University of Oklahoma | 259 |
| University of Colorado | 251 |
| Creighton University | 248 |
| University of Chicago | 246 |
| Stanford University | 242 |
| Southwestern Medical School | 238 |
| Boston University | 237 |
| Chicago Medical School | 235 |
| Emory University | 234 |
| Yale University | 231 |
| Meharry Medical College | 231 |
| Wayne University | 227 |
| Medical College of South Carolina | 216 |
| Vanderbilt University | 209 |
| University of Utah | 194 |
| Syracuse University | 191 |
| Medical College of Alabama | 186 |
| Albany Medical College | 186 |
| Bowman Gray School of Medicine | 180 |
| Woman's Medical College | 161 |
| University of Vermont | 148 |
| Totals | 23,146 |

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of 5.2 students per hundred thousand of population enrolled as freshmen. This is the third successive year in which states with medical schools have sent a significantly larger proportion of their population to medical schools than the states without medical schools. Prior to 1946-1947, statistics showed that states with and states without medical schools sent almost identical proportions of their populations to medical schools.

Of the total of 2,801 freshman students admitted by state and municipal schools during the current year only 229, or 8.2 per cent, were nonresidents. Two years ago 14.8 per cent of freshman students in these schools were nonresidents, while last year only 9.8 per cent were out of state students. In 1941-1942 the last prewar year, the freshman enrolment of the state and municipal schools included 17.4 per cent of out of state students.

The privately owned medical schools admitted a total of 3,887 students during the current year. The number of out of state students in this group was 1,980, or 50.9 per cent. Last year the freshman classes in this group of schools had 51.3 per cent of nonresidents and in the previous year 51.4 per cent. In 1941-1942, these schools enrolled 52.9 per cent nonresident students.

TABLE 10.—*Students in the Medical and Basic Science Schools in the United States, 1931-1949*

Students in the required intern year are not included

| | Freshman | Sophomore | Junior | Senior | Total |
|---|---|---|---|---|---|
| 1930-1931 | 6,456 | 5,558 | 5,080 | 4,908 | 21,982 |
| 1931-1932 | 6,260 | 5,462 | 4,962 | 4,885 | 22,135 |
| 1932-1933 | 6,426 | 5,479 | 5,017 | 4,948 | 22,466 |
| 1933-1934 | 6,457 | 5,571 | 4,988 | 4,937 | 22,750 |
| 1934-1935 | 5,356 | 5,624 | 5,142 | 4,966 | 22,888 |
| 1935-1936 | 6,695 | 5,458 | 5,230 | 5,020 | 22,564 |
| 1936-1937 | 5,910 | 5,369 | 5,140 | 5,158 | 22,695 |
| 1937-1938 | 5,791 | 5,295 | 4,986 | 5,016 | 21,587 |
| 1938-1939 | 5,764 | 5,160 | 4,947 | 4,921 | 21,302 |
| 1939-1940 | 5,794 | 5,177 | 4,921 | 4,864 | 21,371 |
| 1940-1941 | 5,837 | 5,254 | 4,969 | 4,849 | 21,379 |
| 1941-1942 | 6,218 | 5,406 | 5,087 | 4,942 | 22,651 |
| 1942-1943 | 6,425 | 5,828 | 5,278 | 5,160 | 22,631 |
| 1943-1944 | 6,341 | 6,071 | 5,640 | 5,257 | 23,309 |
| 1944 (second session) | 6,618 | 6,140 | 6,084 | 5,794 | 24,636 |
| 1944-1945 | 6,523 | 5,979 | 5,700 | 5,826 | 24,028 |
| 1945-1946 | 6,660 | 5,750 | 5,731 | 5,655 | 23,216 |
| 1946-1947* | 6,564 | 5,575 | 5,767 | 5,994 | 23,900 |
| 1947-1948 | 6,487 | 5,758 | 5,154 | 5,340 | 22,739 |
| 1948-1949 | 6,088 | 6,194 | 5,702 | 5,686 | 23,670 |

* Includes additional classes.

In table 16 is recapitulated the number of resident students from other states, students from the outlying territories and possessions of the United States, Canadian students and foreign students enrolled in the 1948-1949 freshman class in each school in the United States and Canada.

The number of schools that admitted no out of state students increased from nine during the preceding year to thirteen during the current year. Two years ago only six schools limited their admissions to residents, while in the two preceding years every medical school in the United States accepted some out of state students.

Five schools admitted only one or two nonresidents, the same number as last year. Twenty-one schools, one less than last year, admitted more nonresident than resident students.

There were 57 freshman students, 14 fewer than last year and 28 fewer than two years ago, from the outlying territories and possessions of the United States. All but 2 of these students were enrolled in schools in the United States.

TABLE 11.—*Distribution of Students and Graduates by Sex in the United States and Canada, 1948-1949*

| | Students | | Graduates | |
|---|---|---|---|---|
| | Men | Women | Men | Women |
| Medical College of Alabama | 171 | 15 | 24 | 7 |
| University of Arkansas | 280 | 14 | 50 | 4 |
| University of California | 247 | 56 | 51 | 14 |
| College of Medical Evangelists | 288 | 39 | 83 | 2 |
| University of Southern California | 246 | 16 | 58 | 2 |
| Stanford University | 229 | 22 | 53 | 6 |
| University of Colorado | 228 | 23 | 52 | 6 |
| Yale University (Connecticut) | 263 | 28 | 43 | 4 |
| Georgetown University (D. C.) | 371 | 18 | 72 | 1 |
| George Washington University | 289 | 31 | 59 | 10 |
| Howard University | 233 | 42 | 52 | 14 |
| Emory University (Georgia) | 225 | 9 | 37 | 2 |
| University of Georgia | 292 | 10 | 66 | 2 |
| Chicago Medical School (Illinois) | 225 | 10 | .. | .. |
| Northwestern University | 497 | 28 | 124 | 6 |
| Stritch School of Medicine | 277 | 18 | 49 | 4 |
| University of Chicago | 215 | 31 | 49 | 6 |
| University of Illinois | 586 | 67 | 135 | 23 |
| Indiana University | 430 | 28 | 74 | 7 |
| State University of Iowa | 267 | 32 | 49 | 9 |
| University of Kansas | 300 | 25 | 74 | 8 |
| University of Louisville (Kentucky) | 346 | 16 | 79 | 3 |
| Louisiana State University | 294 | 28 | 51 | 7 |
| Tulane University of Louisiana | 460 | 39 | 103 | 11 |
| Johns Hopkins University (Maryland) | 258 | 35 | 65 | 8 |
| University of Maryland | 308 | 29 | 60 | 9 |
| Boston University (Massachusetts) | 217 | 20 | 43 | 9 |
| Harvard Medical School | 479 | 32 | 129 | 12 |
| Tufts College Medical School | 353 | 37 | 64 | 14 |
| University of Michigan | 416 | 53 | 90 | 17 |
| Wayne University | 221 | 6 | 34 | 3 |
| University of Minnesota | 393 | 33 | 111 | 13 |
| University of Mississippi | 108 | 3 | .. | .. |
| University of Missouri | 80 | 7 | .. | .. |
| St. Louis University | 429 | 2 | 90 | 0 |
| Washington University | 320 | 31 | 88 | 8 |
| Creighton University (Nebraska) | 230 | 18 | 34 | 5 |
| University of Nebraska | 283 | 19 | 54 | 4 |
| Dartmouth Med. School (New Hampshire) | 46 | 0 | .. | .. |
| Albany Medical College (New York) | 165 | 21 | 36 | 5 |
| Long Island College of Medicine | 364 | 52 | 84 | 17 |
| University of Buffalo | 257 | 22 | 43 | 6 |
| Columbia University | 379 | 57 | 95 | 23 |
| Cornell University | 382 | 37 | 58 | 11 |
| New York Medical College | 372 | 74 | 75 | 20 |
| New York University | 406 | 72 | 90 | 22 |
| University of Rochester | 240 | 28 | 56 | 12 |
| Syracuse University | 362 | 29 | 33 | 13 |
| University of North Carolina | 103 | 7 | .. | .. |
| Duke University | 257 | 30 | 51 | 8 |
| Bowman Gray School of Medicine | 173 | 13 | 35 | 3 |
| University of North Dakota | 58 | 0 | .. | .. |
| University of Cincinnati (Ohio) | 301 | 26 | 67 | 11 |
| Western Reserve University | 280 | 36 | 66 | 9 |
| Ohio State University | 302 | 30 | 74 | 10 |
| University of Oklahoma | 236 | 23 | 43 | 11 |
| University of Oregon | 96 | 21 | 55 | 4 |
| Hahnemann Med. College (Pennsylvania) | 323 | 43 | 84 | 14 |
| Jefferson Medical College | 635 | 0 | 150 | 0 |
| Temple University | 411 | 50 | 84 | 14 |
| University of Pennsylvania | 434 | 40 | 109 | 11 |
| Woman's Medical College | 0 | 161 | 0 | 30 |
| University of Pittsburgh | 283 | 20 | 62 | 6 |
| Medical College of South Carolina | 204 | 12 | 34 | 8 |
| University of South Dakota | 55 | 1 | .. | .. |
| University of Tennessee | 552 | 56 | 106 | 6 |
| Meharry Medical College | 206 | 25 | 32 | 11 |
| Vanderbilt University | 186 | 14 | 45 | 2 |
| Southwestern Medical School (Texas) | 218 | 20 | 47 | 9 |
| University of Texas | 340 | 34 | 58 | 11 |
| Baylor University | 286 | 18 | 59 | 3 |
| University of Utah | 184 | 10 | 60 | 7 |
| University of Vermont | 130 | 18 | 29 | 5 |
| University of Virginia | 253 | 9 | 54 | 2 |
| Medical College of Virginia | 295 | 31 | 57 | 11 |
| West Virginia University | 52 | 4 | .. | .. |
| University of Wisconsin | 253 | 40 | 47 | 9 |
| Marquette University | 350 | 25 | 65 | 8 |
| University of Alberta (Canada) | 107 | 13 | 31 | 3 |
| University of Manitoba | 263 | 25 | 52 | 7 |
| Dalhousie University | 206 | 9 | 42 | 1 |
| Queen's University *† | 205 | 15 | 41 | 2 |
| University of Western Ontario | 240 | 15 | 49 | 3 |
| University of Toronto * | 507 | 77 | 123 | 31 |
| McGill University | 433 | 32 | 101 | 7 |
| University of Montreal | 380 | 19 | 79 | 4 |
| Laval University † | 457 | 8 | 83 | 0 |
| University of Saskatchewan | 60 | 3 | .. | .. |
| Totals | 24,578 | 2,325 | 5,103 | 670 |

* Excludes 62 and 260 premedical students respectively.
† Excludes 43 and 106 fifth year students respectively.

Seventeen students from Canada, 5 less than last year, were enrolled as freshmen in schools in this country. Forty-two students from other foreign countries, 16 fewer than a year ago, were enrolled in the freshman classes in twenty-four medical schools in the United States.

Of the 846 beginning students in the Canadian schools, 33 came from the United States, 14 more than in the preceding year. Canadian schools enrolled 4 beginning students from other foreign countries.

### Required Internships

The medical schools that require their students to serve an internship are shown in table 17. Seven schools in the United States and three in Canada have

TABLE 12.—*Women in Medicine in the United States*

| Year | Women Students | Percentage of All Students | Women Graduates | Percentage of All Graduates |
|---|---|---|---|---|
| 1905 | 1,073 | 4.1 | 219 | 4.0 |
| 1910 | 997 | 4.0 | 116 | 2.6 |
| 1915 | 592 | 4.0 | 92 | 2.6 |
| 1920 | 818 | 5.8 | 122 | 4.0 |
| 1925 | 970 | 5.0 | 204 | 5.1 |
| 1926 | 955 | 5.0 | 212 | 5.4 |
| 1927 | 964 | 4.9 | 189 | 4.7 |
| 1928 | 929 | 4.5 | 207 | 4.9 |
| 1929 | 925 | 4.4 | 214 | 4.8 |
| 1930 | 955 | 4.4 | 204 | 4.5 |
| 1931 | 990 | 4.5 | 217 | 4.6 |
| 1932 | 955 | 4.3 | 208 | 4.2 |
| 1933 | 1,056 | 4.7 | 214 | 4.4 |
| 1934 | 1,009 | 4.5 | 211 | 4.2 |
| 1935 | 1,077 | 4.7 | 207 | 4.1 |
| 1936 | 1,133 | 5.0 | 246 | 4.7 |
| 1937 | 1,113 | 5.1 | 238 | 4.4 |
| 1938 | 1,161 | 5.4 | 237 | 4.6 |
| 1939 | 1,144 | 5.4 | 260 | 5.1 |
| 1940 | 1,145 | 5.4 | 253 | 5.0 |
| 1941 | 1,146 | 5.4 | 280 | 5.3 |
| 1942 | 1,164 | 5.5 | 279 | 5.4 |
| 1943 | 1,150 | 5.1 | 241 | 4.6 |
| 1944 | 1,176 | 5.0 | 239 | 4.7 |
| 1944 (second session) | 1,141 | 4.6 | 252 | 4.9 |
| 1945 (to June 30) | 1,352 | 5.6 | 262 | 5.1 |
| 1946 (to May 31) | 1,868 | 8.0 | 247 | 4.2 |
| 1947 (to June 30)* | 2,161 | 9.1 | 342 | 5.4 |
| 1948 (to June 30) | 2,159 | 9.5 | 392 | 7.1 |
| 1949 (to June 30) | 2,109 | 8.9 | 612 | 12.1 |

* Includes additional classes.

TABLE 13.—*Enrolment by Classes of Veterans and Non-Veterans in the Medical and Basic Science Schools in the United States, 1948-1949*

| | Men Veterans | Other Men | Total Men | Women Veterans | Other Women | Total Women | Total Men and Women |
|---|---|---|---|---|---|---|---|
| Freshmen | 4,695 | 1,616 | 6,281 | 21 | 386 | 407 | 6,688 |
| Sophomores | 4,544 | 1,178 | 5,722 | 39 | 443 | 472 | 6,194 |
| Juniors | 3,686 | 1,420 | 5,106 | 34 | 502 | 536 | 5,702 |
| Seniors | 2,597 | 1,869 | 4,452 | 5 | 629 | 634 | 5,086 |
| Totals | 15,473 | 6,083 | 21,561 | 99 | 2,030 | 2,109 | 23,670 |

this requirement. All except one of these schools withholds the degree of Doctor of Medicine until the year of internship has been served. Duke issues the degree at the end of the four year medical school course, but obtains from each student a written agreement that he will spend two years in training in a hospital or laboratory. Several of the other schools requiring an internship will accept a year of laboratory work in lieu of an internship.

While most medical schools do not require an internship of their students, it has been well known for many years that more than 99 per cent of all graduates voluntarily serve an internship of at least one year's duration and that the majority take at least one additional year of hospital training before entering the practice of medicine.

In last year's Educational Number it was incorrectly reported that Queen's had instituted a required internship for classes entering in September 1947 and subsequently. While the work of the sixth year at this medical school has been reorganized so that the student spends the year in a hospital designated by the University, the medical school does not consider this year to be an internship.

During the academic year 1948-1949 there were 458 students from schools in this country and 185 from Canada in the required year of internship training or research. The number of students from schools in this country in the required intern year is shown for each year since 1930-1931 in table 8.

States requiring the internship for licensure are listed in table 18. There are now twenty-four such states, Arizona having instituted this requirement during the past year. In addition, the District of Columbia, Alaska, Hawaii, the Virgin Islands and the Canal Zone require a year of internship for licensure. Puerto Rico requires a two year internship. The licensing boards of the Canal Zone, Delaware, Hawaii, Idaho, Illinois, Iowa, Michigan, New Jersey, North Dakota, Pennsylvania, Puerto Rico, Rhode Island, Utah, Vermont and Washington require the internship to be a rotating service.

Five states (Connecticut, Maryland, Missouri, Texas and Virginia) whose laws do not require internship training withhold the licenses of candidates from schools requiring an internship for the degree of Doctor of Medicine until the internship is completed. In these states the examination may be taken at any time after completion of the medical school course.

Some states in addition to those listed in table 18 require an internship of graduates from schools outside the United States and Canada and of applicants for reciprocity or endorsement.

The hospitals approved for intern training by the Council on Medical Education and Hospitals of the American Medical Association are generally acceptable in those states requiring an internship for licensure. The current list of approved internships was published in the May 14, 1949, issue of THE JOURNAL.

Additions to this list appear on page 48 of this issue.

### Graduate, Part Time and Special Students

In table 19 are listed for the United States and Canada those students other than regular medical students and students in a required intern year who were pursuing courses in the medical schools in 1948-1949.

Thirty-one medical schools in the United States enrolled 1,133 physicians who were working toward advanced degrees. Six Canadian schools had 106 physicians enrolled for similar work. Minnesota with 393 reported the largest number of such students.

Other graduate students who were working for advanced degrees in the basic medical sciences numbered 1,765 in the United States and 43 in Canada. These students were distributed among 49 schools in the United States and six schools in Canada. The largest number, 213, was at Minnesota.

The total number of graduate students in the two categories previously described in the United States was 2,898. This figure may be compared with the highest prewar total of graduate students, 1,167, which was reported for the academic year 1940-1941 as an indication of the expansion that is taking place in the graduate study of the medical sciences.

In addition to the students working for advanced degrees, there were 2,039 other nonmedical students taking courses in the medical schools of the United States and 36 in Canada. This number, which largely represents students from other departments of the universities, such as dentistry, public health, nursing, engineering and the arts courses, is probably less than the actual total of students who receive training through the facilities and from the faculties of the medical schools, since several schools which are known to accommodate students from other departments of the University reported no students in this category.

Forty medical schools in the United States reported a total of 1,697 physicians enrolled in formal basic science courses in preparation for certification by a specialty board. This total does not include persons reported under the category of physicians working for advanced degrees who might also be preparing for certification. The highest enrolment in formal basic science courses preparatory for certification was reported by Michigan with 253 students. There was a total of 110 students enrolled in similar courses in three Canadian schools.

Forty-nine medical schools in the United States reported a total enrolment of 15,695 physicians in refresher or continuation courses. Five Canadian schools reported a total enrolment of 691 students in courses of this type.

Ninety-three part time or special students working toward the degree of Doctor of Medicine were enrolled in thirty-three medical schools in the United States. Two such students were reported by one Canadian school.

The students reported in the foregoing categories total 22,422 for the medical schools in the United States and 988 for the Canadian schools. As pointed out in last year's Educational Number, this is impressive evidence that the educational responsibilities of the medical schools extend far beyond the undergraduate student body. The number of other students now almost equals the number of undergraduate medical students. If all schools had submitted complete reports and if the interns and residents who receive clinical instruction from medical school departments were included, the total would probably exceed the number of undergraduate students. It should thus be clear that the relatively elaborate physical plants, large faculties and budgets of the medical schools are not merely serving undergraduate medical education but are also being employed in the interest of other major educational activities.

### Premedical Training

The minimum requirement of the Council on Medical Education and Hospitals for admission to approved medical schools since 1918 has been two years of college training. In 1938 the Council recommended that at least three years of college work be required of all candidates for admission. With the exception of California, the state licensing boards require that an applicant for licensure must present evidence of having completed two years of college. Seventy-three of the seventy-eight medical and basic science schools of the United States require three or more years of premedical work. Four of the Canadian schools have a similar requirement. Six schools, Georgetown, Johns Hopkins, Tufts, Vanderbilt, Kansas and Laval require a bachelor's degree. Georgetown, however, requires only ninety semester hours of college work from veterans. Vanderbilt and Kansas will accept students with three years of college work provided their colleges will grant them a bachelor's degree on the successful completion of the first year of medical school.

Statistics for the freshman class that entered medical school during the past academic year reveal that 3,695, or 55.4 per cent of the freshmen students in the schools of this country, had baccalaureate degrees; 560, or 8.3 per cent, had attended college for four years but had received no degree; 2,379, or 35.5 per cent, had had three years of college work, and only 54, or 0.8 per cent, had had only two years of college.

### The 1949 Freshman Class

As already pointed out, the 1948 freshman class was the largest freshman class ever admitted to the medical schools of the United States. Figures submitted by the individual schools indicate that the 1949 freshman class will surpass the 1948 class by approximately 200 students and may number as many as 6,900 students, to set still another new record for freshman enrolments.

By June of this year, the schools had selected 6,595 students. This group included 3,991 male veterans (60.5 per cent), 2,213 other men (33.6 per cent) and 391 women (5.9 per cent). Fourteen of the women were veterans.

These figures confirm the trend predicted in last year's Educational Number, that the 1947 freshman class with 73.4 per cent veterans marked the peak of the entrance of veterans of World War II into the medical schools.

### New Medical Schools

The University of Washington School of Medicine in Seattle will have completed the organization of its full four-year program during the coming academic year and will graduate its first class in the Spring of 1950. This school has requested approval by the Council and the Association of American Medical Colleges and will be visited by representatives of these bodies after all four classes are in attendance. The Council announced in the Internship and Residency Number of THE JOURNAL (May 14, 1949) that, pending action by the Council, students who graduate from the University of Washington School of Medicine in 1950 will be considered for purposes of internship appointment as if they had graduated from an approved medical school. Hospitals approved for intern training will not lose their approved status if they accept these students for internship.

The 1949 Florida legislature passed an act authorizing the establishment of a medical school as part of the University of Florida at Gainesville. No funds were appropriated, however.

In West Virginia the 1949 legislature authorized the establishment of an interim committee to study the entire problem of medical education in West Virginia, including the possibility of establishing a four year school. This committee will report to the next legislature which meets in January 1951.

The Mississippi State Medical Association and the faculty of the University of Mississippi School of Medicine voted unanimously during the past year to request the establishment of a four year medical school. The governor of the state has announced that he is in favor of the project. The chancellor of the university has appointed a committee to study the problem, and it is hoped that the 1950 legislature will appropriate funds to finance the necessary construction.

TABLE 14.—*Residence of Freshman Medical Students*

| Marginal Number | | 1 Alabama | 2 Arizona | 3 Arkansas | 4 California | 5 Colorado | 6 Connecticut | 7 Delaware | 8 District of Columbia | 9 Florida | 10 Georgia | 11 Idaho | 12 Illinois | 13 Indiana | 14 Iowa |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Medical College of Alabama | 52 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 2 | University of Arkansas School of Medicine | .. | .. | 92 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 3 | University of California Medical School | .. | .. | .. | 71 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 4 | College of Medical Evangelists | .. | 1 | 1 | 17 | 2 | 1 | .. | 1 | 2 | 2 | .. | 2 | 4 | 3 |
| 5 | University of Southern California School of Medicine | .. | 1 | .. | 69 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 6 | Stanford University School of Medicine | .. | 2 | .. | 53 | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. |
| 7 | University of Colorado School of Medicine | .. | .. | .. | .. | 64 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 8 | Yale University School of Medicine | .. | .. | 1 | 5 | .. | 11 | .. | .. | 1 | .. | .. | 6 | 2 | 1 |
| 9 | Georgetown University School of Medicine | .. | .. | .. | 4 | .. | 5 | 1 | 4 | 1 | .. | .. | 1 | 1 | .. |
| 10 | George Washington University School of Medicine | 1 | .. | .. | 7 | .. | .. | .. | 24 | 2 | 1 | .. | .. | 3 | 2 |
| 11 | Howard University College of Medicine | 2 | .. | .. | 1 | .. | 1 | .. | 7 | 4 | .. | .. | 1 | .. | .. |
| 12 | Emory University School of Medicine | 3 | .. | .. | .. | .. | .. | .. | .. | 10 | 40 | .. | .. | .. | .. |
| 13 | University of Georgia School of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | 80 | .. | .. | .. | .. |
| 14 | Chicago Medical School | .. | .. | .. | 4 | 1 | .. | .. | .. | 1 | .. | 1 | 13 | .. | .. |
| 15 | Stritch School of Medicine of Loyola University | .. | 1 | .. | 3 | 2 | .. | .. | .. | 1 | .. | .. | 58 | 13 | 5 |
| 16 | Northwestern University Medical School | 1 | .. | .. | 8 | 1 | 1 | .. | 1 | .. | .. | 1 | 33 | 2 | 1 |
| 17 | University of Chicago, The School of Medicine | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 101 | .. | .. |
| 18 | University of Illinois College of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 144 | .. |
| 19 | Indiana University School of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 91 |
| 20 | State University of Iowa College of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 21 | University of Kansas School of Medicine | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | 2 | .. |
| 22 | University of Louisville School of Medicine | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 23 | Louisiana State University School of Medicine | 21 | .. | 4 | .. | .. | .. | .. | .. | 10 | 1 | .. | 1 | .. | .. |
| 24 | Tulane University of Louisiana School of Medicine | .. | .. | .. | 3 | 1 | 1 | 1 | 3 | 2 | .. | 1 | 3 | 2 | 2 |
| 25 | Johns Hopkins University School of Medicine | .. | .. | .. | 2 | .. | .. | 2 | .. | 4 | 2 | 1 | .. | .. | .. |
| 26 | University of Maryland School of Medicine | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 |
| 27 | Boston University School of Medicine | 1 | 3 | .. | 6 | 2 | 5 | .. | 1 | 2 | 2 | .. | 8 | .. | .. |
| 28 | Harvard Medical School | .. | .. | .. | .. | .. | 9 | .. | .. | .. | .. | .. | .. | .. | .. |
| 29 | Tufts College Medical School | .. | .. | .. | 1 | .. | .. | .. | 1 | 1 | .. | .. | 4 | 1 | .. |
| 30 | University of Michigan Medical School | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 31 | Wayne University College of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 32 | University of Minnesota Medical School | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 33 | University of Mississippi School of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 34 | University of Missouri School of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 35 | St. Louis University School of Medicine | 1 | .. | .. | 9 | 2 | .. | .. | 1 | .. | .. | .. | 9 | 6 | 4 |
| 36 | Washington University School of Medicine | .. | 1 | 2 | 4 | .. | .. | .. | 1 | 2 | .. | 5 | .. | 1 | 5 |
| 37 | Creighton University School of Medicine | .. | .. | .. | 16 | 4 | .. | .. | .. | .. | .. | 2 | .. | .. | 10 |
| 38 | University of Nebraska College of Medicine | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 |
| 39 | Dartmouth Medical School | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 40 | Albany Medical College | .. | .. | .. | .. | .. | 3 | .. | .. | .. | .. | .. | 2 | .. | .. |
| 41 | Long Island College of Medicine | .. | .. | .. | 1 | .. | 6 | .. | .. | 1 | .. | .. | .. | .. | .. |
| 42 | University of Buffalo School of Medicine | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 43 | Columbia University College of Physicians and Surgeons | 2 | .. | 1 | 6 | .. | 5 | .. | 1 | 2 | 2 | .. | 2 | 2 | .. |
| 44 | Cornell University Medical College | .. | .. | .. | .. | 1 | 1 | .. | 1 | 2 | .. | .. | .. | 2 | .. |
| 45 | New York Medical College, Flower and Fifth Avenue Hospitals | .. | .. | .. | .. | .. | 8 | .. | 1 | .. | .. | .. | 1 | .. | .. |
| 46 | New York University College of Medicine | .. | .. | .. | .. | .. | 4 | .. | 1 | .. | .. | .. | 1 | .. | .. |
| 47 | University of Rochester School of Medicine and Dentistry | .. | 1 | .. | 3 | 1 | 4 | .. | .. | .. | .. | .. | 1 | .. | .. |
| 48 | Syracuse University College of Medicine | .. | 1 | .. | .. | .. | 4 | .. | .. | 1 | .. | .. | 1 | .. | .. |
| 49 | University of North Carolina School of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 50 | Duke University School of Medicine | 4 | 1 | .. | 2 | 1 | 1 | .. | 2 | 4 | .. | .. | .. | .. | .. |
| 51 | Bowman Gray School of Medicine | 1 | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. |
| 52 | University of North Dakota School of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 53 | University of Cincinnati College of Medicine | .. | .. | .. | 3 | .. | 1 | .. | .. | .. | .. | .. | .. | 4 | .. |
| 54 | Western Reserve University School of Medicine | .. | .. | .. | 1 | .. | 1 | .. | .. | .. | .. | .. | 1 | 3 | .. |
| 55 | Ohio State University College of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 56 | University of Oklahoma School of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 57 | University of Oregon Medical School | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | 3 | .. | .. | .. | .. |
| 58 | Hahnemann Medical College | 4 | .. | .. | 5 | .. | 2 | .. | .. | .. | .. | .. | .. | 1 | .. |
| 59 | Jefferson Medical College of Philadelphia | 2 | .. | .. | 3 | 2 | 2 | 1 | .. | 2 | .. | .. | 1 | 1 | .. |
| 60 | Temple University School of Medicine | 1 | 1 | .. | 3 | .. | 3 | 3 | .. | 10 | .. | .. | 1 | .. | 1 |
| 61 | University of Pennsylvania School of Medicine | 1 | .. | .. | 4 | 2 | 3 | .. | .. | 1 | 1 | 1 | 1 | .. | .. |
| 62 | Woman's Medical College of Pennsylvania | 1 | .. | .. | 4 | .. | 2 | .. | 2 | 1 | .. | .. | 3 | .. | .. |
| 63 | University of Pittsburgh School of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 64 | Medical College of the State of South Carolina | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 65 | University of South Dakota School of Medical Sciences | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | 1 |
| 66 | University of Tennessee College of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 67 | Meharry Medical College | 3 | 1 | .. | 3 | 1 | .. | 1 | 1 | .. | 3 | .. | 7 | 1 | .. |
| 68 | Vanderbilt University School of Medicine | 6 | .. | .. | .. | .. | .. | .. | .. | 2 | 1 | .. | 1 | .. | .. |
| 69 | Southwestern Medical School of the University of Texas | .. | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 70 | University of Texas School of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 71 | Baylor University College of Medicine | .. | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 72 | University of Utah School of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3 | .. | .. | .. | .. |
| 73 | University of Vermont College of Medicine | .. | .. | .. | .. | .. | 3 | .. | 1 | .. | .. | .. | .. | .. | .. |
| 74 | University of Virginia Department of Medicine | .. | 1 | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. |
| 75 | Medical College of Virginia | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. |
| 76 | West Virginia University School of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 77 | University of Wisconsin Medical School | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. |
| 78 | Marquette University School of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 3 | .. |
| 79 | University of Alberta Faculty of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 80 | University of Manitoba Faculty of Medicine | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 81 | Dalhousie University Faculty of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 82 | Queen's University Faculty of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 83 | University of Western Ontario Faculty of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 84 | University of Toronto Faculty of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 85 | McGill University Faculty of Medicine | .. | .. | 1 | 1 | 1 | 4 | .. | .. | .. | .. | .. | .. | .. | .. |
| 86 | University of Montreal Faculty of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 87 | Laval University Faculty of Medicine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 88 | University of Saskatchewan School of Medical Sciences | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | Totals | 114 | 30 | 102 | 330 | 87 | 94 | 9 | 52 | 72 | 149 | 20 | 377 | 204 | 130 |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |

* Figures include two freshman classes.

† Figures are for students in beginning premedical year.

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| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kansas | Kentucky | Louisiana | Maine | Maryland | Massachusetts | Michigan | Minnesota | Mississippi | Missouri | Montana | Nebraska | Nevada | New Hampshire | New Jersey | New Mexico | New York | North Carolina | North Dakota | Ohio | Oklahoma | Oregon | Pennsylvania | Rhode Island | South Carolina | South Dakota | Tennessee | Texas | Utah | Vermont | Virginia | Washington | West Virginia | Wisconsin | Wyoming | U. S. Territories and Possessions | Canada | Foreign | Totals | Marginal Number |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 53 | 1 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 52 | 2 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 72 | 3 |
| 3 | 1 | .. | .. | .. | 1 | 4 | 1 | .. | 1 | 1 | 4 | 1 | .. | 2 | .. | 5 | 1 | 1 | 2 | 2 | 5 | 2 | .. | .. | 2 | 2 | 4 | 1 | .. | .. | 4 | .. | .. | .. | 9 | 1 | 97 | 4 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 66 | 5 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | 1 | 1 | .. | 1 | 63 | 6 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 64 | 7 |
| 1 | 1 | .. | 2 | 2 | .. | 2 | 2 | .. | 1 | .. | .. | .. | .. | 1 | .. | 17 | .. | .. | 1 | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | 2 | 1 | .. | 2 | .. | .. | .. | 65 | 8 |
| .. | 1 | 1 | 1 | 2 | 9 | 1 | .. | .. | .. | 1 | .. | .. | 2 | 15 | .. | 28 | 1 | .. | 4 | .. | .. | 26 | 7 | .. | .. | .. | .. | .. | 1 | .. | 1 | .. | .. | 2 | .. | .. | .. | 120 | 9 |
| .. | .. | .. | 1 | 4 | .. | 2 | 3 | .. | .. | 2 | 1 | 1 | .. | 6 | .. | 2 | .. | .. | 2 | .. | .. | 5 | .. | 1 | .. | .. | .. | 2 | .. | 10 | .. | 3 | .. | 2 | 2 | .. | .. | 92 | 10 |
| .. | .. | 2 | .. | .. | .. | 2 | .. | .. | 2 | .. | .. | .. | .. | 1 | .. | 18 | 6 | .. | 1 | 1 | .. | 5 | .. | 4 | .. | 2 | 3 | .. | .. | 3 | 1 | 1 | .. | .. | .. | .. | 6 | 74 | 11 |
| .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | .. | .. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | 73 | 12 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 80 | 13 |
| .. | 1 | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | 6 | .. | 44 | .. | .. | 2 | .. | .. | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 72 | 14 |
| .. | .. | .. | .. | .. | 4 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 2 | .. | .. | 10 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | 1 | 89 | 15 |
| .. | .. | 1 | .. | .. | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 6 | .. | .. | 1 | 1 | .. | 1 | .. | .. | .. | 2 | .. | 4 | 3 | .. | .. | 5 | 3 | .. | .. | .. | 1 | 129 | 16 |
| 3 | 1 | .. | .. | .. | 1 | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | 6 | 1 | .. | 1 | 1 | .. | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | 3 | .. | .. | 1 | .. | 72 | 17 |
| .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 166 | 18 |
| .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 2 | 150 | 19 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 92 | 20 |
| 80 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 84 | 21 |
| .. | 85 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | .. | .. | 2 | .. | .. | 96 | 22 |
| .. | .. | 94 | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 101 | 23 |
| 1 | 2 | 25 | .. | .. | 1 | .. | .. | 28 | .. | .. | .. | .. | .. | .. | 1 | 7 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | 2 | 15 | .. | .. | 2 | .. | 2 | .. | 1 | 1 | .. | 2 | 129 | 24 |
| 1 | .. | .. | 1 | 16 | .. | 3 | .. | 2 | 2 | 1 | .. | 1 | 2 | 2 | .. | 5 | 2 | .. | 3 | .. | .. | 3 | 2 | 3 | .. | .. | 4 | .. | 2 | .. | 4 | 1 | 2 | .. | .. | .. | 79 | 25 |
| 1 | .. | .. | 2 | 55 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | .. | 1 | 3 | .. | .. | 6 | .. | .. | .. | .. | 2 | .. | .. | 1 | 3 | 7 | 1 | .. | 4 | .. | .. | 98 | 26 |
| 1 | .. | .. | 2 | .. | .. | .. | .. | .. | .. | 1 | .. | .. | 1 | 7 | .. | 15 | .. | .. | .. | .. | 1 | 2 | 2 | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 3 | .. | 1 | 71 | 27 |
| 1 | 2 | .. | 3 | .. | 15 | 1 | 5 | .. | .. | 3 | 2 | .. | .. | 6 | .. | 29 | .. | .. | 6 | 1 | .. | 4 | 1 | .. | .. | 1 | .. | 3 | 1 | .. | 4 | 2 | .. | .. | 2 | .. | 1 | 113 | 28 |
| .. | .. | .. | 6 | .. | 77 | .. | .. | .. | .. | .. | .. | .. | 6 | .. | .. | 7 | 1 | .. | .. | .. | .. | 1 | 11 | .. | 1 | .. | .. | .. | .. | 1 | .. | .. | 1 | .. | 1 | .. | 1 | 147 | 29 |
| .. | .. | .. | .. | .. | 1 | 111 | 2 | .. | 1 | .. | .. | .. | .. | 1 | .. | 7 | 1 | .. | 6 | .. | .. | .. | .. | 1 | .. | 1 | 1 | .. | .. | 1 | 1 | .. | 1 | 1 | .. | 1 | 147 | 30 |
| .. | .. | .. | .. | .. | .. | 68 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 63 | 31 |
| .. | .. | .. | .. | .. | .. | .. | .. | 190 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | 125 | 32 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | 56 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 58 | 33 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 47 | 34 |
| 1 | 3 | .. | 1 | .. | 1 | 5 | 2 | 1 | 28 | 2 | 1 | .. | .. | 1 | .. | 2 | .. | .. | 21 | 2 | .. | 3 | .. | .. | 1 | 1 | 3 | .. | .. | .. | 6 | 1 | .. | 1 | 2 | 1 | .. | 123 | 35 |
| 1 | 2 | .. | .. | .. | 2 | 1 | .. | .. | 31 | .. | 1 | .. | .. | 1 | .. | 7 | .. | .. | 1 | 2 | 2 | 2 | 1 | .. | 1 | 2 | .. | .. | .. | .. | 3 | 1 | 2 | .. | 1 | .. | 86 | 36 |
| 2 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | 23 | .. | .. | .. | 2 | 1 | .. | .. | .. | 1 | .. | 1 | .. | .. | 2 | .. | 1 | .. | .. | 1 | 4 | .. | .. | 1 | 1 | .. | 75 | 37 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 82 | .. | .. | .. | .. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 88 | 38 |
| .. | .. | .. | 1 | 1 | 3 | .. | 1 | .. | 1 | .. | .. | .. | 3 | 1 | .. | 6 | .. | .. | 3 | .. | .. | 3 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | 21 | 39 |
| .. | .. | .. | .. | .. | 2 | .. | 1 | .. | .. | .. | 1 | .. | .. | 3 | .. | 25 | .. | .. | 1 | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 2 | 50 | 40 |
| .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 10 | .. | 80 | .. | .. | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 1 | .. | .. | 2 | .. | 5 | 113 | 41 |
| .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 4 | .. | 54 | 1 | .. | 3 | .. | .. | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | 71 | 42 |
| .. | .. | .. | 2 | 1 | 5 | .. | .. | 1 | .. | .. | 1 | 1 | 1 | 13 | 1 | 44 | .. | .. | 4 | .. | .. | 1 | .. | .. | .. | 1 | 2 | .. | .. | 3 | .. | .. | 1 | .. | .. | 2 | 114 | 43 |
| .. | .. | .. | 2 | .. | 4 | .. | .. | .. | .. | .. | .. | .. | .. | 13 | .. | 44 | .. | .. | 5 | 1 | .. | 2 | 1 | .. | .. | 1 | .. | 1 | .. | 1 | .. | .. | 1 | 1 | .. | .. | 84 | 44 |
| .. | .. | .. | .. | .. | 3 | .. | .. | .. | .. | .. | .. | .. | 1 | 14 | .. | 87 | .. | .. | 4 | .. | .. | 4 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 124 | 45 |
| .. | .. | .. | .. | .. | 3 | .. | .. | .. | .. | .. | .. | .. | .. | 90 | .. | 94 | .. | .. | .. | .. | .. | 2 | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 128 | 46 |
| 3 | .. | .. | .. | 2 | 1 | .. | .. | 1 | .. | 1 | .. | .. | .. | 3 | .. | 36 | .. | .. | 4 | .. | .. | 3 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 1 | 1 | 1 | .. | 1 | 47 |
| 1 | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | 1 | .. | 4 | .. | 37 | .. | .. | 2 | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 55 | 48 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 60 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 69 | 49 |
| 2 | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | .. | 1 | .. | .. | 2 | .. | 5 | 25 | .. | 3 | 2 | 1 | 3 | .. | 8 | .. | .. | 4 | .. | .. | 2 | .. | .. | .. | .. | 2 | 76 | 50 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | 1 | .. | 1 | 45 | .. | .. | .. | .. | 1 | .. | 3 | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 55 | 51 |
| .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 28 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | 30 | 52 |
| .. | 5 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 2 | .. | 70 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 80 | 53 |
| .. | 1 | .. | .. | 1 | .. | 2 | .. | .. | .. | .. | .. | .. | .. | 2 | .. | 5 | 1 | .. | 51 | 1 | .. | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 1 | .. | 1 | 3 | 80 | 54 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 86 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 88 | 55 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 64 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 64 | 56 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 57 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 8 | .. | .. | 1 | 1 | .. | 76 | 57 |
| .. | .. | 1 | .. | .. | .. | 2 | 1 | 1 | .. | .. | .. | .. | 12 | .. | 4 | .. | 1 | 5 | .. | .. | 62 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 1 | .. | 105 | 58 |
| .. | .. | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | 22 | .. | 4 | 2 | .. | 4 | .. | .. | 97 | 2 | 1 | .. | .. | .. | .. | .. | .. | 11 | .. | .. | 5 | .. | 1 | .. | 166 | 59 |
| .. | .. | .. | 1 | 2 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | 2 | 1 | 8 | .. | .. | 2 | .. | 74 | .. | 1 | 2 | .. | 1 | 1 | 2 | .. | 1 | 3 | 1 | .. | .. | .. | 1 | 137 | 60 |
| .. | 1 | .. | .. | 2 | 1 | .. | .. | .. | .. | .. | .. | .. | 7 | .. | 8 | 3 | .. | 3 | 3 | 2 | 73 | 1 | 2 | 1 | .. | .. | 1 | .. | .. | 2 | 3 | .. | .. | .. | 3 | 126 | 61 |
| .. | .. | .. | .. | 1 | 1 | 3 | .. | .. | .. | .. | 1 | .. | 4 | 1 | 7 | .. | .. | .. | 3 | .. | 11 | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | .. | 1 | .. | 1 | .. | 1 | 50 | 62 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 86 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 86 | 63 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 69 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 69 | 64 |
| 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 24 | .. | .. | 1 | .. | .. | .. | 1 | .. | 1 | .. | .. | 31 | 65 |
| .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 152 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 153 | 66 |
| 1 | .. | 3 | .. | 2 | .. | 3 | .. | 2 | 2 | .. | .. | .. | .. | .. | .. | 11 | 4 | .. | 4 | .. | .. | 1 | .. | .. | .. | 6 | 2 | .. | .. | 7 | .. | .. | .. | .. | .. | .. | 69 | 67 |
| .. | 9 | .. | .. | .. | .. | .. | .. | 4 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | 2 | .. | .. | .. | 2 | .. | 99 | 4 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 81 | 68 |
| 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3 | .. | .. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | 54 | .. | .. | .. | .. | .. | .. | 1 | .. | .. | 61 | 69 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 110 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 110 | 70 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 88 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 91 | 71 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 48 | .. | .. | .. | .. | .. | .. | .. | .. | 52 | 72 |
| .. | .. | .. | 2 | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | 5 | .. | 5 | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | 21 | .. | .. | 1 | .. | .. | 1 | .. | 40 | 73 |
| .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | 1 | .. | 3 | 1 | .. | .. | .. | 1 | .. | .. | 1 | .. | 2 | .. | .. | .. | 56 | .. | 3 | .. | 1 | .. | .. | 74 | 74 |
| .. | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 5 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 71 | .. | 3 | .. | 2 | .. | .. | 84 | 75 |
| .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 31 | .. | .. | .. | .. | .. | 31 | 76 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 77 | .. | 77 | 77 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3 | .. | 3 | .. | .. | 4 | .. | 1 | 7 | .. | .. | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | 64 | .. | 2 | 1 | 80 | 78 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 50 | .. | 50 | 79 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 71 | .. | 72 | 80 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 58 | .. | 58 | 81 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 61 | .. | 61 | 82 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 60 | .. | 60 | 83 |
| .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 149 | .. | 150 | 84 |
| .. | .. | .. | 2 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | 2 | 1 | .. | 5 | .. | .. | 2 | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3 | .. | .. | 1 | 87 | 4 | 116 | 85 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 130 | .. | 132 | 86 |
| .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 119 | .. | 124 | 87 |
| .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 32 | .. | 32 | 88 |
| 106 | 124 | 128 | 32 | 90 | 149 | 220 | 144 | 102 | 124 | 35 | 114 | 6 | 21 | 306 | 8 | 786 | 163 | 36 | 344 | 99 | 74 | 312 | 33 | 86 | 58 | 194 | 307 | 67 | 24 | 159 | 52 | 90 | 107 | 7 | 57 | 824 | 46 | 7,534 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 |

The North Carolina legislature during the past year increased the appropriation for the construction of the plant for the projected four year medical school to $8,500,000. This figure does not include an additional $1,000,000 that has been appropriated for a dental clinic building. Construction will begin in the fall of 1949. It appears now that instruction in the third year will be started in the fall of 1952 or 1953.

The Medical School of the University of California in Los Angeles has begun preparation of the site for its buildings, and it is hoped that the school will open in the fall of 1952.

The New Jersey State Medical Society in May 1948 passed a resolution requesting the governor of the state to appoint a survey committee to study the problem of establishing a medical school as a department of the State University at Rutgers. In April 1949 the governor completed the appointment of this committee, which will report to him at the conclusion of its studies.

Missouri and North Dakota are actively studying the possibility of expanding to four year programs, but no definite plans have been developed.

TABLE 15.—*Ratio of Freshman Medical Students[1] to State Populations, Academic Year 1948-1949*

Number of students per 100,000 population[2] in the medical and basic science schools of the United States

| | | | |
|---|---|---|---|
| *New Mexico | 1.5 | Georgia | 4.7 |
| Washington | 2.2 | Connecticut | 4.8 |
| *Wyoming | 2.6 | Oregon | 4.8 |
| *Arizona | 3.1 | West Virginia | 4.8 |
| *Delaware | 3.1 | Mississippi | 4.9 |
| *Florida | 3.1 | Pennsylvania | 4.9 |
| Missouri | 3.2 | Iowa | 5.0 |
| California | 3.3 | Louisiana | 5.0 |
| *Maine | 3.6 | Minnesota | 5.0 |
| Massachusetts | 3.6 | *Montana | 5.1 |
| *Idaho | 3.8 | Wisconsin | 5.1 |
| Michigan | 3.8 | Arkansas | 5.3 |
| New Hampshire | 3.9 | Indiana | 5.3 |
| Oklahoma | 3.9 | Virginia | 5.3 |
| Alabama | 4.0 | Kansas | 5.4 |
| Maryland | 4.2 | New York | 5.5 |
| *Nevada | 4.3 | District of Columbia | 6.0 |
| Texas | 4.3 | Tennessee | 6.3 |
| North Carolina | 4.4 | South Dakota | 6.6 |
| *Rhode Island | 4.4 | Vermont | 6.6 |
| Illinois | 4.5 | North Dakota | 6.7 |
| Kentucky | 4.5 | Colorado | 7.6 |
| *New Jersey | 4.5 | Nebraska | 8.9 |
| Ohio | 4.5 | Utah | 10.5 |
| South Carolina | 4.5 | | |

* State with no medical or basic science school.
1. Calculations based on one freshman class for each school.
2. 1948 Census Report, U. S. Department of Commerce.

### Vacancies on Instructional Staffs

During and after the war, almost all medical schools experienced difficulty in finding qualified men to fill vacant or newly created positions on their instructional staffs. For this reason information was requested as to the number of full time positions on their teaching staffs for 1949-1950 that the medical schools had been unable to fill up to June 1949.

In the United States twelve schools reported that they had no unfilled positions, thirty-nine schools had unfilled positions in both preclinical and clinical departments, twenty schools had unfilled positions in the preclinical departments only and six in the clinical departments only. One school was unable to provide information. The total number of unfilled full time positions was 441, 240 in the preclinical departments and 201 in the clinical departments.

During the year 1948-1949 figures from seventy-seven of the schools in the United States revealed that they employed 2,462 instructors in the preclinical departments on a full time basis. The number of

TABLE 16.—*Residence of Freshman Students in Medical and Basic Science Schools in the United States and Canada, 1948-1949*

| | Home State | Other State | Terr. & Poss. | Canadian | Foreign | Totals |
|---|---|---|---|---|---|---|
| Medical College of Alabama | 52 | 0 | 0 | 0 | 0 | 52 |
| University of Arkansas | 92 | 0 | 0 | 0 | 0 | 92 |
| University of California | 71 | 0 | 0 | 0 | 1 | 72 |
| College of Medical Evangelists | 17 | 70 | 0 | 0 | 1 | 97 |
| University of Southern California | 63 | 3 | 0 | 0 | 0 | 66 |
| Stanford University | 53 | 8 | 1 | 0 | 1 | 63 |
| University of Colorado | 64 | 0 | 0 | 0 | 0 | 64 |
| Yale University (Connecticut) | 11 | 52 | 2 | 0 | 0 | 65 |
| Georgetown University (D. C.) | 4 | 114 | 2 | 0 | 0 | 120 |
| George Washington University | 24 | 66 | 2 | 0 | 0 | 92 |
| Howard University | 7 | 61 | 0 | 0 | 6 | 74 |
| Emory University (Georgia) | 49 | 23 | 1 | 0 | 0 | 73 |
| University of Georgia | 80 | 0 | 0 | 0 | 0 | 80 |
| Chicago Medical School (Illinois) | 11 | 59 | 0 | 0 | 0 | 72 |
| Northwestern University | 53 | 75 | 0 | 0 | 0 | 128 |
| Stritch School of Medicine | 57 | 31 | 1 | 0 | 1 | 90 |
| University of Chicago | 33 | 38 | 0 | 1 | 0 | 72 |
| University of Illinois | 161 | 5 | 0 | 0 | 0 | 166 |
| Indiana University | 144 | 4 | 0 | 0 | 2 | 150 |
| State University of Iowa | 91 | 1 | 0 | 0 | 0 | 92 |
| University of Kansas | 82 | 2 | 0 | 0 | 0 | 84 |
| University of Louisville (Kentucky) | 89 | 2 | 0 | 0 | 0 | 91 |
| Louisiana State University | 94 | 7 | 0 | 0 | 0 | 101 |
| Tulane University of Louisiana | 25 | 101 | 1 | 1 | 1 | 129 |
| Johns Hopkins University (Maryland) | 16 | 61 | 0 | 0 | 2 | 79 |
| University of Maryland | 55 | 39 | 4 | 0 | 0 | 98 |
| Boston University (Massachusetts) | 31 | 36 | 5 | 0 | 1 | 71 |
| Harvard Medical School | 15 | 95 | 2 | 0 | 1 | 113 |
| Tufts College Medical School | 77 | 34 | 0 | 0 | 0 | 111 |
| University of Michigan | 111 | 34 | 1 | 0 | 1 | 147 |
| Wayne University | 68 | 0 | 0 | 0 | 0 | 68 |
| University of Minnesota | 120 | 5 | 0 | 0 | 0 | 125 |
| University of Mississippi | 56 | 0 | 0 | 0 | 0 | 56* |
| University of Missouri | 47 | 0 | 0 | 0 | 0 | 47 |
| St. Louis University | 28 | 92 | 2 | 1 | 0 | 123 |
| Washington University | 31 | 54 | 1 | 0 | 0 | 86 |
| Creighton University (Nebraska) | 23 | 51 | 1 | 0 | 0 | 75 |
| University of Nebraska | 82 | 6 | 0 | 0 | 0 | 88 |
| Dartmouth Med. School (New Hampshire) | 3 | 21 | 0 | 0 | 0 | 24 |
| Albany Medical College (New York) | 35 | 12 | 1 | 0 | 2 | 50 |
| Long Island College of Medicine | 80 | 26 | 2 | 0 | 5 | 113 |
| University of Buffalo | 54 | 16 | 1 | 0 | 0 | 71 |
| Columbia University | 53 | 58 | 1 | 0 | 2 | 114 |
| Cornell University | 44 | 37 | 1 | 0 | 0 | 82 |
| New York Medical College | 87 | 37 | 0 | 0 | 0 | 124 |
| New York University | 94 | 33 | 0 | 0 | 1 | 128 |
| University of Rochester | 36 | 29 | 1 | 1 | 1 | 68 |
| Syracuse University | 37 | 18 | 0 | 0 | 1 | 56 |
| University of North Carolina | 60 | 0 | 0 | 0 | 0 | 60 |
| Duke University | 25 | 49 | 0 | 0 | 2 | 76 |
| Bowman Gray School of Medicine | 43 | 10 | 0 | 0 | 0 | 53 |
| University of North Dakota | 28 | 2 | 0 | 0 | 0 | 30 |
| University of Cincinnati (Ohio) | 70 | 20 | 0 | 0 | 0 | 90 |
| Western Reserve University | 51 | 25 | 1 | 0 | 3 | 80 |
| Ohio State University | 88 | 0 | 0 | 0 | 0 | 88 |
| University of Oklahoma | 64 | 0 | 0 | 0 | 0 | 64 |
| University of Oregon | 57 | 17 | 1 | 1 | 0 | 76 |
| Hahnemann Med. College (Pennsylvania) | 62 | 41 | 1 | 0 | 1 | 105 |
| Jefferson Medical College | 97 | 63 | 5 | 0 | 1 | 166 |
| Temple University | 74 | 56 | 6 | 0 | 1 | 137 |
| University of Pennsylvania | 73 | 50 | 0 | 0 | 3 | 126 |
| Woman's Medical College | 11 | 37 | 1 | 0 | 1 | 50 |
| University of Pittsburgh | 86 | 0 | 0 | 0 | 0 | 86 |
| Medical College of South Carolina | 60 | 0 | 0 | 0 | 0 | 60 |
| University of South Dakota | 24 | 6 | 1 | 0 | 0 | 31 |
| University of Tennessee | 152 | 1 | 0 | 0 | 0 | 153 |
| Meharry Medical College | 6 | 63 | 0 | 0 | 0 | 69 |
| Vanderbilt University | 20 | 31 | 0 | 0 | 0 | 51 |
| Southwestern Medical School (Texas) | 54 | 9 | 1 | 0 | 0 | 64 |
| Baylor University | 88 | 3 | 0 | 0 | 0 | 91 |
| University of Texas | 110 | 0 | 0 | 0 | 0 | 110 |
| University of Utah | 48 | 4 | 0 | 0 | 0 | 52 |
| University of Vermont | 21 | 18 | 0 | 1 | 0 | 40 |
| University of Virginia | 56 | 17 | 1 | 0 | 0 | 74 |
| Medical College of Virginia | 71 | 12 | 0 | 0 | 0 | 83 |
| West Virginia University | 31 | 0 | 0 | 0 | 0 | 31 |
| University of Wisconsin | 77 | 2 | 0 | 1 | 0 | 80 |
| Marquette University | 64 | 33 | 2 | 1 | 0 | 100 |
| University of Alberta (Canada) | 0 | 0 | 0 | 50 | 0 | 50 |
| University of Manitoba | 0 | 1 | 0 | 71 | 0 | 72 |
| Dalhousie University | 0 | 0 | 0 | 58 | 0 | 58 |
| Queen's University | 0 | 1 | 0 | 61 | 0 | 62** |
| University of Western Ontario | 0 | 0 | 0 | 60 | 0 | 60 |
| University of Toronto | 0 | 1 | 0 | 149 | 0 | 150** |
| McGill University | 0 | 24 | 1 | 87 | 4 | 116 |
| University of Montreal | 0 | 2 | 0 | 120 | 0 | 122 |
| Laval University | 0 | 4 | 1 | 119 | 0 | 124 |
| University of Saskatchewan | 0 | 0 | 0 | 32 | 0 | 32 |
| Totals | 4,481 | 2,136 | 57 | 824 | 46 | 7,544 |

* Figures include two freshman classes.
** Figures for students in beginning premedical year.

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unfilled positions thus represents approximately 10 per cent of the total positions in the preclinical departments of the schools in the United States.

Comparable figures for the total number of full time positions in the clinical departments are not available since some schools in reporting included residents and others did not. From the figures submitted, however, it may be estimated that the number of full time positions in the clinical departments of the medical schools, excluding residents, is approximately 2,200, so that the vacancies in this area are in the neighborhood of 9 per cent.

In Canada three schools reported no unfilled positions, five schools reported vacancies on the staffs of their preclinical departments and two schools vacancies in both preclinical and clinical departments. The total number of unfilled positions was 36, 25 in the preclinical departments, and 11 in the clinical departments.

A shortage of trained personnel as a result of the war and the relatively low salary scale prevailing in a number of medical schools are undoubtedly both responsible for the inability of the schools to fill these vacant positions. From the information available it is not possible to determine which of these factors is the more important.

### Instruction in Clinical Effects of Nuclear Energy

Four years have elapsed since it became known that the ability to release nuclear energy on a catastrophic scale created new and important problems for the medical profession and that radioactive substances could be prepared in relatively large quantities for biologic investigations. It is of interest, therefore, to determine the extent to which the medical schools are including in the undergraduate curriculum instruction in the clinical effects of nuclear energy.

Forty-nine medical schools and two schools of the basic sciences in the United States report that they offer such instruction. In the majority of the schools instruction in this subject is included in established courses, such as radiology, medicine, biochemistry, physiology and pharmacology. Ten schools, Colorado, Northwestern, Iowa, Johns Hopkins, Duke, Hahnemann, Meharry, Vanderbilt, Southwestern and the Chicago Medical School, report that they give separate courses in the subject ranging from 4 to 36 hours in length and averaging 16 hours.

### Plans of Medical Students for Future Practice

In last year's Educational Number it was reported that a poll of eighteen classes conducted by fifteen medical schools during the year 1947-1948 revealed that there was basis for questioning the concern that has been expressed in some quarters that few present day medical students are planning to enter general practice. The over-all averages for the eighteen classes reported showed that 36 per cent of the students planned to enter general practice, 36 per cent to specialize and 28 per cent were undecided.

During the year 1948-1949 eighteen medical schools polled forty-three of their classes to determine the students' plans with respect to practice.

Polls of fifteen senior classes were conducted. In eight classes of the students who had made a tentative decision, the majority planned to specialize. In the other seven the majority planned to enter general practice. The average for the fifteen classes were: 44.7 per cent intended to specialize; 38.4 per cent intended to enter general practice, and 16.9 per cent were undecided.

Eleven junior classes were polled. In nine classes the majority of students planned to enter general practice. In the other two schools the vote was in favor of specialization, although in both schools almost half the class was undecided. The averages for the eleven classes were: 47 per cent planned to do general practice; 26.6 per cent planned to specialize and 26.4 per cent were undecided.

Polls of seventeen freshman and sophomore classes revealed that in thirteen classes the majority of those having a definite preference planned to enter general practice while in four the majority intended to specialize. The average for the seventeen classes were: 44.9 per cent planned to enter general practice; 18.5 per cent planned to specialize, and 36.6 per cent were undecided.

In summary of the forty-three classes polled, in twenty-eight classes the majority of students who had reached a decision planned to enter general practice, while in fourteen classes the majority planned to specialize.

TABLE 17.—*Medical Schools Requiring an Internship* *

| UNITED STATES |
|---|
| College of Medical Evangelists |
| University of Southern California School of Medicine |
| Stanford University School of Medicine |
| Chicago Medical School |
| Northwestern University Medical School |
| University of Minnesota Medical School |
| Duke University School of Medicine † |
| **CANADA** |
| University of Manitoba Faculty of Medicine |
| Dalhousie University Faculty of Medicine |
| University of Montreal Faculty of Medicine |

* Certain schools will accept a year of laboratory work in lieu of the internship.
† Degree not withheld until internship completed.

TABLE 18.—*Medical Licensing Boards Requiring a One Year Internship* *

| | | |
|---|---|---|
| Alabama | Michigan† | Puerto Rico‡ |
| Alaska | Montana | Rhode Island† |
| Arizona | Nevada | South Dakota |
| Canal Zone† | New Hampshire | Utah† |
| Delaware† | New Jersey† | Vermont† |
| District of Columbia | New Mexico | Virgin Island |
| Hawaii† | North Dakota† | Washington† |
| Idaho† | Oklahoma | West Virginia |
| Illinois† | Oregon | Wisconsin |
| Iowa† | Pennsylvania† | Wyoming |

* Some states require the internship for graduates of medical faculties abroad and from reciprocity or endorsement applicants.
† Internship must be a rotating service.
‡ Two year rotating internship required.

The over-all averages for the forty-three classes included in the study were: 43.1 per cent planned to enter general practice; 29.7 per cent planned to specialize, and 27.2 per cent were undecided.

Forty-two schools reported programs to stimulate the interest of the students in careers in general practice. The programs included special lectures on general practice in nineteen schools, preceptorships with general practitioners in nine, counseling service in seven, scholarships in six and clerkships in rural hospitals or in a general practice outpatient department in four schools. One school has its students make a survey of rural areas in the state to determine the needs and opportunities for physicians.

Ten schools reported that they were sponsoring internships or residency programs specifically designed for prospective general practitioners.

### Financial Support of Medical Schools

The budgets of the medical and basic science schools in the United States for the academic year 1949-1950 total approximately $61,000,000. This sum represents an increase of $10,000,000 over the figures reported for the previous year.

The figure $61,000,000 does not include grants for research or special teaching projects from outside agencies or any significant portion of the cost of operating the teaching hospitals of the country. It does include a total of approximately $2,900,000 that the medical schools will spend to support certain activities in their affiliated hospitals. As in the previous year this sum is largely made up of salaries of professional and technical personnel on hospital staffs, the cost of operating special laboratories and in a few instances contributions to the operating budgets of hospitals and dispensaries used by the medical school for teaching purposes.

The figure $61,000,000 does not include certain major expenditures, chiefly of a nonrecurring nature, which the schools estimate will total approximately $5,800,000. This sum will be spent largely for construction and renovations and the purchase of special equipment.

As in previous years, the total of $61,000,000 that it will cost to operate the medical schools during the coming year does not include the direct and frequently substantial contributions that a number of teaching hospitals make to the educational programs of their affiliated schools, nor does it include the value of the services contributed by unpaid members of the teaching staffs who in many schools are responsible for a major part of the instruction, especially in the clinical departments.

This year all but five schools supplied figures which included the cost of maintenance of the physical plant and all but three the cost of operating the library. Last year fourteen schools did not report the cost of plant maintenance, and four did not include the budgets of their libraries.

Two schools, one less than last year, included a charge for general university administration in their

TABLE 19.—*Other Students Enrolled in Medical Schools, 1948-1949*

| School | Part Time or Special Medical Students Working Toward M.D. Degree | Physicians Enrolled for Advanced Degrees | Other Graduate Students Working for Degrees in Basic Medical Sciences | Nonmedical Students Taking Medical Courses | Physicians Enrolled in Refresher or Continuation Courses | Physicians Enrolled in Formal Basic Science Courses in Preparation for Specialty Board Certification | Totals |
|---|---|---|---|---|---|---|---|
| Medical College of Alabama | 2 | 2 | 3 | 18 | 0 | 11 | 36 |
| University of Arkansas | 3 | 0 | 7 | 28 | 0 | 0 | 38 |
| College of Medical Evangelists (Calif.) | 3 | 0 | 0 | 0 | 84 | 48 | 135 |
| Stanford University | 1 | 0 | 0 | 0 | 180 | 0 | 180 |
| University of California | 0 | 0 | 0 | 9 | 706 | 52 | 767 |
| University of Southern California | 0 | 18 | 143 | 0 | 367 | 37 | 565 |
| University of Colorado | 8 | 151 | 46 | 29 | 0 | 4 | 238 |
| Yale University (Connecticut) | 0 | 0 | 87 | 5 | 329 | 80 | 501 |
| George Washington University (D. C.) | 0 | 0 | 68 | 0 | 350 | 0 | 418 |
| Georgetown University | 0 | 1 | 3 | 4 | 25 | 0 | 33 |
| Howard University | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Emory University (Georgia) | 1 | 0 | 0 | 28 | 4 | 0 | 33 |
| University of Georgia | 9 | 0 | 0 | 4 | 134 | 0 | 147 |
| Chicago Medical School (Ill.) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Northwestern University | 4 | 64 | 69 | 1 | 18 | 94 | 241 |
| Stritch School of Medicine | 1 | 3 | 16 | 0 | 1 | 14 | 35 |
| University of Chicago | 0 | 10 | 200 | 0 | 0 | 4 | 214 |
| University of Illinois | 1 | 40 | 71 | 1 | 96 | 23 | 232 |
| Indiana University | 0 | 11 | 10 | 12 | 190 | 39 | 262 |
| State University of Iowa | 0 | 15 | 53 | 0 | 257 | 95 | 420 |
| University of Kansas | 1 | 5 | 17 | 5 | 657 | 39 | 705 |
| University of Louisville (Ky.) | 2 | 0 | 0 | 5 | 490 | 2 | 499 |
| Louisiana State University | 1 | 0 | 0 | 0 | 32 | 76 | 109 |
| Tulane University | 3 | 24 | 0 | 0 | 221 | 45 | 293 |
| Johns Hopkins Univ. (Md.) | 0 | 0 | 0 | 1 | 98 | 0 | 99 |
| University of Maryland | 0 | 2 | 18 | 1 | 20 | 3 | 44 |
| Boston University (Mass.) | 0 | 0 | 30 | 0 | 0 | 0 | 30 |
| Harvard Medical School | 0 | 0 | 45 | 0 | 436 | 103 | 584 |
| Tufts College Medical School | 0 | 0 | 0 | 0 | 272 | 0 | 272 |
| University of Michigan | 2 | 0 | 0 | 1,647 | 1,173 | 253 | 3,075 |
| Wayne University | 4 | 110 | 22 | 0 | 271 | 0 | 415 |
| University of Minnesota | 0 | 381 | 213 | 0 | 1,021 | 47 | 1,674 |
| University of Mississippi | 3 | 0 | 6 | 5 | 0 | 2 | 16 |
| St. Louis University (Mo.) | 3 | 52 | 17 | 46 | 0 | 2 | 120 |
| University of Missouri | 0 | 0 | 37 | 16 | 0 | 0 | 53 |
| Washington University | 0 | 0 | 38 | 0 | 174 | 97 | 309 |
| Creighton University (Neb.) | 6 | 0 | 1 | 7 | 0 | 0 | 14 |
| University of Nebraska | 0 | 8 | 5 | 2 | 25 | 0 | 40 |
| Dartmouth Medical School (New Hampshire) | 0 | 0 | 1 | 1 | 0 | 0 | 2 |
| Albany Med. College (N. Y.) | 5 | 0 | 0 | 0 | 0 | 0 | 5 |
| Columbia University | 0 | 16 | 0 | 0 | 1,149 | 114 | 1,279 |
| Cornell University | 0 | 2 | 13 | 0 | 148 | 39 | 199 |
| Long Island Col. of Medicine | 0 | 39 | 0 | 0 | 748 | 19 | 797 |
| New York Medical College | 0 | 38 | 0 | 0 | 277 | 38 | 353 |
| New York University | 0 | 0 | 65 | 13 | 1,877 | 0 | 1,955 |
| Syracuse University | 0 | 0 | 3 | 0 | 184 | 0 | 187 |
| University of Buffalo | 0 | 0 | 9 | 0 | 80 | 4 | 93 |
| University of Rochester | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Duke University (North Carolina) | 0 | 0 | 10 | 0 | 104 | 5 | 119 |
| University of North Carolina | 1 | 0 | 41 | 22 | 352 | 0 | 416 |
| Bowman Gray School of Medicine | 1 | 0 | 7 | 0 | 0 | 0 | 8 |
| University of North Dakota | 1 | 0 | 1 | 0 | 0 | 0 | 2 |
| Ohio State University | 0 | 9 | 53 | 0 | 0 | 0 | 62 |
| University of Cincinnati | 1 | 19 | 25 | 16 | 196 | 0 | 257 |
| Western Reserve University | 1 | 2 | 58 | 0 | 146 | 66 | 273 |
| University of Oklahoma | 0 | 1 | 10 | 0 | 428 | 19 | 458 |
| University of Oregon | 0 | 6 | 12 | 3 | 738 | 0 | 759 |
| Hahnemann Medical College (Pennsylvania) | 0 | 0 | 2 | 0 | 0 | 0 | 2 |
| Jefferson Medical College | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Temple University | 2 | 66 | 0 | 0 | 102 | 22 | 192 |
| University of Pennsylvania | 0 | 0 | 131 | 1 | 45 | 0 | 177 |
| University of Pittsburgh | 5 | 0 | 0 | 0 | 0 | 0 | 5 |
| Woman's Medical College | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Medical College of South Carolina | 0 | 0 | 0 | 2 | 203 | 12 | 217 |
| University of South Dakota | 4 | 0 | 0 | 1 | 0 | 1 | 6 |
| Meharry Medical College (Tennessee) | 4 | 0 | 4 | 14 | 11 | 0 | 33 |
| University of Tennessee | 0 | 16 | 22 | 0 | 0 | 0 | 38 |
| Vanderbilt University | 0 | 0 | 4 | 0 | 0 | 0 | 4 |
| Baylor University (Texas) | 0 | 0 | 0 | 0 | 200 | 15 | 215 |
| Southwestern Medical School | 0 | 0 | 0 | 7 | 8 | 10 | 25 |
| University of Texas | 0 | 0 | 7 | 0 | 804 | 0 | 804 |
| University of Utah | 3 | 1 | 17 | 44 | 120 | 0 | 185 |
| University of Vermont | 1 | 0 | 0 | 12 | 0 | 6 | 19 |
| Medical College of Virginia | 0 | 0 | 15 | 3 | 82 | 75 | 175 |
| University of Virginia | 0 | 9 | 0 | 0 | 0 | 58 | 67 |
| West Virginia University | 2 | 0 | 0 | 0 | 0 | 0 | 2 |
| Marquette University (Wis.) | 4 | 1 | 2 | 8 | 0 | 52 | 67 |
| University of Wisconsin | 0 | 0 | 37 | 17 | 0 | 0 | 54 |
| Totals | 93 | 1,133 | 1,765 | 2,039 | 15,695 | 1,697 | 22,422 |
| **CANADA** | | | | | | | |
| Dalhousie University | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Laval University (Quebec) | 0 | 3 | 3 | 0 | 0 | 0 | 6 |
| McGill University (Montreal) | 0 | 0 | 0 | 2 | 203 | 0 | 205 |
| Queen's University (Kingston) | 0 | 21 | 0 | 23 | 98 | 0 | 132 |
| University of Alberta (Edmonton) | 0 | 0 | 7 | 0 | 237 | 4 | 248 |
| University of Manitoba (Winnipeg) | 0 | 5 | 3 | 1 | 51 | 0 | 60 |
| University of Montreal | 0 | 6 | 0 | 0 | 0 | 0 | 6 |
| University of Saskatchewan (Saskatoon) | 0 | 0 | 2 | 0 | 0 | 0 | 2 |
| University of Toronto | 0 | 36 | 0 | 0 | 102 | 71 | 213 |
| University of Western Ontario | 2 | 35 | 19 | 0 | 0 | 35 | 91 |
| Totals | 2 | 106 | 43 | 36 | 691 | 110 | 988 |

budgets. The other schools in which such a charge is made were able to subtract this item so that their figures could be compared with those from the schools not having such a charge.

The net result of including the cost of plant maintenance for nine additional schools and the cost of the library for one additional school and of deducting the charge for general university administration for one school was an increase in the total budgets of the medical schools of $600,000 over the figure reported for the previous year.

It is appreciated that changes in the procedures followed by the medical schools in reporting their budgets and changes in the number of approved medical schools make exact comparisons of the budgets for one year with those of another year impossible without a detailed audit. A reasonably accurate correction can be made for these differences, however, which will permit an estimate of the order of magnitude of the increases that have occurred in the medical school budgets during the past three years. It can thus be calculated that the total of the budgets for the year 1949-1950 represents a real increase of approximately 19 per cent over the total for 1948-1949 and of approximately 34 per cent over the total for 1947-1948.

It is of some interest to compare in a general way the figure $61,000,000 reported by the medical schools as the total of their budgets for the coming year with total budgets of the prewar years. The only figures presently available for this comparison are those furnished by the medical schools at the time of the survey conducted by the Council in 1934-1936. The budgets for the sixty-six medical schools and ten schools of the basic medical sciences then in operation totaled only $23,500,000.

The range of expenditures per student by the medical schools will vary in 1949-1950 from $917 to $9,500. For the country as a whole the average expenditure per student will be $2,577 and the median $2,364. In table 20 the seventy-eight medical and basic science schools in the United States have been arranged in eight groups according to their anticipated expenditures per student. A comparison of these figures with those for 1948-1949 reveals that for the coming academic year the number of schools spending less than $1,500 per student has decreased from sixteen to ten, the number spending $2,000 or more per student has increased from thirty-nine to fifty-two, and the number spending $3,000 or more has increased from twelve to twenty-seven.

Receipts from tuition fees during the coming year will total $13,900,000, or 22.8 per cent of the budgets of the medical schools. Last year tuition fees provided $12,800,000, or 25 per cent of the budgets, while in 1947-1948 tuition fees amounted to $12,000,000, or 28 per cent of the budgets of the schools. The number of schools unable to match student fees dollar for dollar with funds from nonstudent sources remains at seven, the same number as in 1948-1949.

The schools have estimated that during the academic year 1949-1950 they will receive from outside agencies a total of $21,000,000 in grants for research and $4,000,000 in grants for special teaching activities. Last year funds received in these categories totaled $21,100,000 and $2,700,000, respectively.

No attempt was made to secure complete budgetary information for the teaching hospitals used by the medical schools. Sixteen schools did report the budgets for their teaching hospitals. The total of these budgets was $29,000,000. Patient charges will be used in part to meet these expenses, but the greatest part of the budgets will be provided by direct appropriation from state or university funds.

Despite the increased funds that the medical schools will receive during the coming academic year, only eight schools have reported that they do not stand in need of additional operating funds to meet their essential needs. The majority of schools have specified sums in the range of $100,000 to $400,000 annually as the amount of additional support that they require. A few schools expressed a need for larger sums.

Thirty-four of the schools reported that the prospect of receiving adequate financial support from local sources is more favorable at present than a year ago. Twenty-eight stated the belief that the situation is unchanged and fourteen that the prospects are less favorable. Two schools did not offer an opinion.

Several bills have been introduced into the present Congress to provide federal support for the medical schools. One bill, S. 1453, has been reported favorably by the Senate Committee on Labor and Public Welfare, but no action had been taken by the Senate at the time this report was prepared.

During the past year several groups interested in medical education have joined in actively exploring the possibility of establishing an organization to secure

TABLE 20.—*Expenditures per Student by the Medical and Basic Science Schools in the United States, 1949-1950, Excluding Research Funds from Outside Sources*

| | Number of Schools |
|---|---|
| $ 917 to 999 | 1 |
| 1,000 to 1,499 | 9 |
| 1,500 to 1,999 | 16 |
| 2,000 to 2,499 | 15 |
| 2,500 to 2,999 | 10 |
| 3,000 to 3,999 | 18 |
| 4,000 to 4,999 | 4 |
| Over 5,000 | 5 |
| Total | 78 |

funds on a national scale from voluntary sources for the support of the medical schools. The initial response by leaders in many fields to the establishment of such an organization has been favorable. It is not unlikely, therefore, that the formation of such an organization may be announced before the end of the present year.

During the past three years there has been grave concern that the financial problems of the medical schools would lead to a rapid deterioration in the quality of medical education in this country. At the end of the war most schools were unable to see new sources of financial support to meet rapidly rising costs and to replace funds lost through lowered returns on endowments and the decrease in individual gifts as the result of high taxes. It is still too early to conclude that the crisis has been passed. On the other hand, the favorable developments of the past year should allay some of the worst fears that have been prevalent. The budgets of most schools have been increased materially, and it would appear that the threat of an immediate halt to progress and a consequent decline in standards is being met.

Several schools are still faced with serious financial problems, some of long standing and others of more recent origin. Almost all schools are still concerned about the uncertainty of the future. The definite increase in local support that has already materialized and the real interest in the financial problems of the medical schools that has been awakened during the past year in high quarters, both private and governmental,

should be construed as promising evidence that the schools will not be without necessary funds in the years ahead.

### Fees

The average tuition fee for an academic year charged by the medical schools in the United States increased 36 per cent from the year 1939-1940 through the academic year which has just ended. It was pointed out in last year's Educational Number that this increase amounted to less than half of the general increase in the cost of living that occurred during the same period. It is not surprising, therefore, that twenty-four medical schools have found it necessary to announce increases in tuition charges for the coming year. These increases will raise the average tuition fee from $513 for 1948-1949 to $548 for 1949-1950. The average tuition fee now stands at 148 per cent of the average tuition fee in 1939-1940. Despite this increase, tuition fees, as pointed out in the preceding section, will provide only 22.8 per cent of the cost of operating the medical schools during the forthcoming year.

In table 21 the eighty-eight medical schools and schools of the basic medical sciences in the United States and Canada have been arranged in groups according to tuition fees charged resident students for

TABLE 21.—*Fees in Medical and Basic Science Schools in the United States and Canada*

| | 1948-1949 Number of Schools | 1949-1950 Number of Schools |
|---|---|---|
| $100 to 199 | 4 | 3 |
| 200 to 299 | 10 | 9 |
| 300 to 399 | 16 | 14 |
| 400 to 499 | 11 | 11 |
| 500 to 599 | 9 | 11 |
| 600 to 699 | 26 | 18 |
| 700 to 799 | 9 | 16 |
| 800 to 830 | 3 | 8 |
| | — | — |
| Total | 88 | 88 |

the sessions 1948-1949 and 1949-1950. The median fee of medical schools in the United States for resident students for 1949-1950 will be $577. The figures in table 21 represent one fourth of the total tuition fee charged for the four years of the medical school course, including minor charges such as those for matriculation, breakage, diploma and graduation. Thirty-two schools in the United States make an additional charge for nonresidents ranging from $78 to $400.

### Private and Governmental Medical Schools

In the course of the various discussions that have taken place in recent years concerning possible sources of increased financial support for medical education, many requests have been made for statistical data with respect to various activities of the privately owned medical schools, on the one hand, and those schools owned by governmental units, on the other.

For this reason a summary of certain pertinent data for the schools in the United States, classified as to the nature of their ownership, are presented in this section. It should be pointed out that, while the medical schools can be readily classified as to whether they are owned by a unit of government or by a private corporation, when the source of their operating funds is considered the distinction is not so sharp. Thus several governmental schools possess endowments of their own and receive funds from other private sources. On the other hand, certain privately owned schools, notably the schools in Pennsylvania, receive substantial financial aid from state tax funds. One privately owned school receives major financial assistance from the federal government. In recent years, practically all medical schools have received grants from one or another federal agency. These grants, however, are usually for specific projects and except for the school previously referred to do not constitute direct aid to the medical schools in financing their basic programs.

TABLE 22.—*Medical Schools Classified by Ownership, 1948-1949*

**Privately Owned**

College of Medical Evangelists (Calif.)
Stanford University School of Medicine
University of Southern California School of Medicine
Yale University School of Medicine (Conn.)
George Washington University School of Medicine (D. C.)
Georgetown University School of Medicine
Howard University College of Medicine
Emory University School of Medicine (Ga.)
Chicago Medical School (Ill.)
Stritch School of Medicine of Loyola University
Northwestern University Medical School
University of Chicago, The School of Medicine
Tulane University of Louisiana School of Medicine (La.)
Johns Hopkins University School of Medicine (Md.)
Boston University School of Medicine (Mass.)
Harvard Medical School
Tufts College Medical School
St. Louis University School of Medicine (Mo.)
Washington University School of Medicine
Creighton University School of Medicine (Nebr.)
Dartmouth Medical School (N. H.)
Albany Medical College (N. Y.)
Columbia University College of Physicians and Surgeons
Cornell University Medical College
Long Island College of Medicine
New York Medical College, Flower and Fifth Avenue Hospitals
New York University College of Medicine
Syracuse University College of Medicine
University of Buffalo School of Medicine
University of Rochester School of Medicine and Dentistry
Duke University School of Medicine (N. C.)
Bowman Gray School of Medicine of Wake Forest College
Western Reserve University School of Medicine (Ohio)
Hahnemann Medical College and Hospital of Philadelphia (Pa.)
Jefferson Medical College of Philadelphia
Temple University School of Medicine
University of Pennsylvania School of Medicine
University of Pittsburgh School of Medicine
Woman's Medical College of Pennsylvania
Meharry Medical College (Tenn.)
Vanderbilt University School of Medicine
Baylor University College of Medicine (Texas)
Southwestern Medical College of the Southwestern Medical Foundation
Marquette University School of Medicine (Wis.)

**State Owned**

Medical College of Alabama
University of Arkansas School of Medicine
University of California Medical School
University of Colorado School of Medicine
University of Georgia School of Medicine
University of Illinois College of Medicine
Indiana University School of Medicine
State University of Iowa College of Medicine
University of Kansas School of Medicine
Louisiana State University School of Medicine
University of Maryland School of Medicine
University of Michigan Medical School
University of Minnesota Medical School
University of Mississippi School of Medicine
University of Missouri School of Medicine
University of Nebraska College of Medicine
University of North Carolina School of Medicine
University of North Dakota School of Medicine
Ohio State University College of Medicine
University of Oklahoma School of Medicine
University of Oregon Medical School
Medical College of the State of South Carolina
University of South Dakota School of Medical Sciences
University of Tennessee College of Medicine
University of Texas School of Medicine
University of Utah School of Medicine
University of Vermont College of Medicine
Medical College of Virginia
University of Virginia Department of Medicine
West Virginia University School of Medicine
University of Wisconsin Medical School

**Municipally Owned**

University of Louisville School of Medicine
Wayne University College of Medicine
University of Cincinnati College of Medicine

During the academic year 1948-1949 forty-four schools were owned by private corporations which in all cases were nonprofit organizations, exempt from federal income taxation; thirty-one schools were owned by states and three by municipal governments. In table 22 the schools are listed according to the nature of their ownership.

During the coming academic year three schools, Syracuse, Long Island and Southwestern, will pass from private to state ownership. For the purpose of compiling the statistics in this section, however, these schools are classified as private schools in accordance with their status during the period covered.

Of the forty-four private schools thirty-five are integral departments of a university while nine are independent institutions without university affiliations. The schools in the latter group are: College of Medical Evangelists, Chicago Medical School, Long Island College of Medicine, New York Medical College, Hahnemann Medical College, Jefferson Medical College, Woman's Medical College, Meharry Medical College and Southwestern Medical College.

Of the thirty-four governmental schools two are independent institutions, the Medical College of the State of South Carolina and the Medical College of Virginia.

Enrolments in the private schools during 1948-1949 numbered 14,126, or 59.7 per cent of the total for the country. The enrolments in the governmental schools was 9,544, or 40.3 per cent.

The freshman classes in the private schools totaled 3,887 and in the governmental schools 2,801, or 58.1 per cent and 41.9 per cent, respectively. The private schools graduated 3,191 physicians, 61.8 per cent of the total for the year, and the government schools 1,969, or 38.2 per cent.

Statistics with respect to the enrolment of resident and nonresident students by the governmental and private schools have already been presented in the section on the geographic source of freshman students.

The budgets for the governmental schools in 1948-1949 totaled approximately $19,519,000 and for the private schools approximately $31,860,000.

The range of resident tuition fees in the governmental schools for 1948-1949 was $115 to $567, with an average of $349 and a median of $375. For the private schools tuition fees ranged from $351 to $831. The median and the average were both $650.

### Selective Service Act

In last year's Educational Number reference was made to the fact that the National Headquarters of the Selective Service System after consultation with representatives of the medical schools was preparing to announce a plan which would make it possible for a certain number of students in premedical and medical courses to be given consideration for a deferred classification.

This plan was published in November 1948 as Local Board Memorandum No. 7 issued by the National Headquarters of the Selective Service System. The principal feature of this plan provides for the issuance by the medical schools of certificates identifying registrants with the Selective Service System who are attending medical schools as bona fide medical students. The plan also permits the medical schools to issue certificates for a limited number of premedical students whom the medical schools have provisionally selected for admission.

Before this plan had been in operation for more than a few months, it was announced by the National Military Establishment in the early part of 1949 that inductions under the 1948 Selective Service Act were being postponed indefinitely. As a consequence medical schools were advised that there was no need at present for them to undertake the added work of selecting and certifying premedical students for provisional acceptance. The schools were advised, however, to continue to submit certificates on Selective Service Form 103 for medical students and premedical students whom they had definitely accepted for admission and who are registered with Selective Service. This advice was based on the fact that the local boards are continuing to classify registrants. If a situation should arise requiring inductions, medical students for whom certificates have not been issued and who are classified as available for induction might have difficulty in having their classification corrected before they are ordered to active duty. The National Headquarters of the Selective Service System therefore advises that medical schools continue until further notice to fill out and file with the National Headquarters Form 103 for the aforementioned students.

It is understood that, at the time inductions were suspended, the National Headquarters of the Selective Service System was giving favorable consideration to a broader plan of deferments that would have included preprofessional and professional students in many fields of learning. This newer plan will probably not be promulgated unless inductions are resumed.

## POSTGRADUATE AND CONTINUATION COURSES FOR PHYSICIANS

The Council on Medical Education and Hospitals publishes semiannually in THE JOURNAL lists of postgraduate and continuation courses for physicians. The opportunities presented in these listings include a wide variety of fields in clinical medicine and the basic sciences. These courses vary in length from a few days to a year or longer. Some are concentrated full time courses; others are part time. In the June 25, 1949, issue of THE JOURNAL more than 800 courses covering the period from July 1, 1949, to Jan. 15, 1950, are listed. The medical schools take a prominent part in presenting this type of training. In addition, other agencies offering courses employ the facilities of the medical schools. State and county medical societies, hospitals, state and city boards of health and special societies are also active in providing leadership in developing this aspect of medical education.

With the exception of the formal basic science courses, these postgraduate and continuation courses are not designed to prepare physicians for specialty board certification. Some opportunities are offered for review work in preparation for examination in the specialties.

This section is devoted to an analysis of the courses offered during the period, July 1, 1948 to June 30, 1949. Mention is also made of some of the recent developments in postgraduate education. The statistical summaries are divided into three groups: short review courses of five days or less, courses of more than five days' duration and, lastly, a group including clinical conferences, graduate assemblies, study courses and courses of a chautauqua nature. Figures are also given for three previous years to show the continued popularity of this type of education.

### Recent Developments

The Committee on Postgraduate Instruction of the California Medical Association has developed a series of postgraduate courses throughout the state under the direction of a part time medical director given by faculty members of the medical schools in California. The program provides for two to three day sessions in cities in the center of a territory of seven or eight counties.

The University of Colorado Medical Center is offering postgraduate training for general practitioners through its Division of Graduate Medical Education. A five day course is offered, each day being devoted to a definite medical subspecialty. The sessions include formal lectures, case presentations and panel discussions.

Yale University School of Medicine, through its Committee on Postgraduate Instruction, has instituted a number of nonresident courses of instruction, on both a part time and full time basis. In cooperation with the Connecticut State Medical Society, a questionnaire was mailed to all physicians in the state in an effort to determine what type of courses would have the widest appeal.

The University of Florida Graduate School, in cooperation with the Florida Medical Association and the State Board of Health, offers seminars on special topics every month.

A postgraduate psychiatric institute given under the auspices of the Maryland Association of Private Practicing Physicians and the Division of Mental Hygiene of the State Department of Health was planned for all practicing physicians of the state except psychiatrists. The content of the program was directed toward helping the practicing physician to expand his psychiatric knowledge. It included didactic lectures, case presentations and discussions in which the students participated. The facilities of the University of Maryland School of Medicine were made available to the institute.

The Massachusetts Medical Society sponsors a graduate program for all physicians of the state. On the basis of geography and population centers, the state is divided into ten districts or teaching centers. Each district, with the exception of the Greater Boston District, has three or four programs a year. These programs are comprehensive in nature and are presented by a team of instructors. Programs generally utilize an afternoon and evening in a given center. In the Greater Boston District a six week program is presented covering a wide range of subjects. All instruction is provided free of charge.

A new program in the Wayne University Graduate School, Detroit, is one offering advanced work leading to the degree, Master of Science in Ophthalmology. The course is for physicians who wish to specialize in ophthalmology and is offered through the facilities of the College of Medicine.

The New York Post-Graduate Medical School has been merged into the New York University-Bellevue Medical Center. Following this merger the formation of a new postgraduate school was announced to be known as the Post-Graduate Medical School of the New York University-Bellevue Medical Center. The New York Post-Graduate Medical School was incorporated in 1882 and was the first postgraduate medical institute in the United States. The annual registration of the school has been in excess of 1,000 physicians and specialists. Postgraduate courses have been offered by New York University College of Medicine since 1920, and a postgraduate medical division was established in 1945. Negotiations between the two schools began December 1946.

The Special Training Division of the Oak Ridge Institute of Nuclear Studies will offer three basic courses in the technics of using radioisotopes as tracers. Each course will cover four weeks. Each session is divided into laboratory work, lectures on laboratory experiments, general background lectures and special topic seminars.

TABLE 23.—*Postgraduate Courses Offered and Attendance*

| | 1945-1946 | | | 1946-1947 | | | 1947-1948 | | | 1948-1949 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Courses | Number Reporting Attendance | Attendance | Total Courses | Number Reporting Attendance | Attendance | Total Courses | Number Reporting Attendance | Attendance | Total Courses | Number Reporting Attendance | Attendance |
| Short review courses (5 days or less) | 154 | 128 | 4,140 | 239 | 205 | 16,274 | 406 | 478 | 31,569 | 304 | 262 | 16,821 |
| Courses of less than a year and more than 5 days | 1,070 | 1,043 | 19,691 | 1,291 | 1,127 | 23,062 | 1,279 | 1,183 | 24,878 | 1,074 | 984 | 28,507 |
| Clinical conferences, graduate assemblies, study and chautauqua courses | 52 | 52 | 21,824 | 21 | 21 | 20,475 | 25 | 25 | 26,356 | 67 | 67 | 38,058 |
| Totals | 1,276 | 1,223 | 45,955 | 1,551 | 1,353 | 59,811 | 1,800 | 1,686 | 82,803 | 1,445 | 1,313 | 83,386 |

### Analysis of Courses Offered in 1948-1949

*Short Review Courses.*—Thirty-one states and the District of Columbia provided courses of five days' duration or less. These states offered 304 courses as follows:

| | | | |
|---|---|---|---|
| Alabama | 1 | Minnesota | 15 |
| California | 17 | Missouri | 2 |
| Colorado | 4 | Nebraska | 2 |
| Connecticut | 14 | New Jersey | 2 |
| District of Columbia | 19 | New York | 74 |
| Florida | 4 | North Carolina | 2 |
| Georgia | 3 | Ohio | 2 |
| Illinois | 18 | Oklahoma | 5 |
| Indiana | 4 | Oregon | 2 |
| Iowa | 3 | Pennsylvania | 12 |
| Kansas | 17 | Tennessee | 2 |
| Kentucky | 1 | Texas | 7 |
| Louisiana | 5 | Utah | 4 |
| Maryland | 1 | Virginia | 1 |
| Massachusetts | 25 | Washington | 1 |
| Michigan | 25 | Wisconsin | 10 |
| | | | 304 |

The subjects of these courses of less than five days' duration included:

Anesthesiology
Bacteriology
Cardiovascular disease
Chest diseases
Dermatology and syphilology
Diabetes
Electrocardiography
Gastroenterology
Hematology
Industrial health
Internal medicine
Legal medicine
Malignant diseases
Obstetrics and gynecology
Ophthalmology
Orthopedic surgery
Otolaryngology
Pathology
Pediatrics
Pharmacology
Physical medicine
Physiological chemistry
Physiology
Poliomyelitis
Proctology
Public health
Radiology
Surgery
Therapy
Urology
Venereal diseases

The programs varied in length from sessions of one hour or a series of five or more lectures to four days' full time and consisted of organized courses, clinics utilizing hospital patients, lectures and demonstrations. Of the 304 courses reported, 81 covered five days full time, 38 were four day courses, 42 were three day courses, 34 two days and 42 one full day. The remainder of the courses were reported by lectures, sessions or hours. The type of instruction was didactic, clinical or both. The instructors were chosen from physicians practicing in the state in which the courses were offered as well as from out of state. Medical school faculties participated in 108 courses. The facilities used for conducting these courses included hospitals, clinics, medical schools and hotels.

These offerings were held every month, the majority being given in January, February, March, April and October, while in 27 instances they were arranged at the convenience of the applicant. Six were available for specialists only. Thirty-six were offered continuously throughout the year. Fees ranged from $2 to $375. The majority were less than $50. In 27 instances no fee was charged.

Sponsoring agencies included 23 medical schools, 4 county and 13 state medical societies, 6 state boards of health and 28 other agencies including hospitals and special societies.

The attendance reported for 262 courses was 16,821. For 42 courses no attendance was reported.

Twenty-seven scheduled courses were cancelled.

*Courses of More than Five Days.*—In centers where ample clinical facilities are available, 1,074 graduate courses of more than five days' duration were offered in thirty-three states and the District of Columbia during 1948-1949. These states and the number of courses which were given in each state are as follows:

| | | | |
|---|---|---|---|
| Arkansas | 2 | Minnesota | 14 |
| California | 66 | Mississippi | 2 |
| Colorado | 3 | Missouri | 9 |
| Connecticut | 6 | New Jersey | 12 |
| District of Columbia | 23 | New York | 446 |
| Florida | 2 | North Carolina | 2 |
| Georgia | 13 | Ohio | 10 |
| Illinois | 175 | Oklahoma | 5 |
| Indiana | 6 | Oregon | 18 |
| Iowa | 7 | Pennsylvania | 40 |
| Kansas | 2 | South Dakota | 1 |
| Kentucky | 6 | Tennessee | 3 |
| Louisiana | 16 | Texas | 13 |
| Maine | 1 | Utah | 2 |
| Maryland | 9 | Virginia | 2 |
| Massachusetts | 87 | Washington | 6 |
| Michigan | 52 | Wisconsin | 10 |
| | | Total | 1,074 |

These courses, consisting of refresher courses of more than five days to intensive courses extending over one year, were offered in the following subjects. The number of courses in each subject is also given.

| | | | |
|---|---|---|---|
| Allergy | 25 | Neurology and psychiatry | 58 |
| Anatomy | 42 | Nuclear physics | 1 |
| Anesthesiology | 22 | Nutrition | 4 |
| Arthritis | 3 | Obstetrics and gynecology | 69 |
| Bacteriology | 7 | Ophthalmology | 52 |
| Basic sciences | 25 | Oral medicine | 1 |
| Biochemistry | 1 | Orthopedic surgery | 17 |
| Cardiovascular disease | 63 | Otolaryngology | 26 |
| Chest diseases | 26 | Otorhinolaryngology | 6 |
| Dermatology and syphilology | 23 | Pathology | 36 |
| Diabetes | 9 | Pediatrics | 50 |
| Electrocardiography | 42 | Pharmacology | 1 |
| Electroencephalography | 9 | Physical medicine | 9 |
| Endocrinology | 33 | Physiology | 19 |
| Endoscopy | 16 | Poliomyelitis | 4 |
| Fractures | 6 | Proctology | 14 |
| Gastroenterology | 37 | Public health | 14 |
| General medicine | 41 | Radiology | 45 |
| Genetics | 1 | Surgery | 67 |
| Geriatrics | 1 | Therapy | 5 |
| Hematology | 24 | Tropical medicine | 2 |
| Histology | 1 | Urology | 27 |
| Internal medicine | 76 | Venereal diseases | 6 |
| Malignant diseases | 6 | Total | 1,074 |

The length of these courses varied from six days to one month for 435 courses. There were 500 courses offered ranging in length from one to four months and 96 from five to twelve months. There were 27 one year courses and 2 given for three years, while the length of the course in 14 instances was arranged.

The description of these intensive courses indicated that instruction was both clinical and didactic. Instruction was both didactic and clinical for 550 courses, didactic only for 197 and clinical only for 39. The remainder did not specify the type of instruction.

Medical school facilities were used for 543 courses, hospitals for 256 and clinics for 20. In many instances, two or all three of these sources were used in presenting an individual course. Hotel and other facilities were used for 23 courses. The balance did not specify the facilities used.

The faculties of medical schools served as instructors in 572 courses. Additional instructors were specialists in their field (in 502 instances), chosen mainly from physicians residing within the state in which the course was given but including as well physicians from outside the state.

Courses were offered during every month last year, and in 125 instances they were arranged to suit the convenience of physician-students. There were 88 courses available for specialists only. Fees varied considerably, ranging from $1.50 to $1,000. In 39 instances no fee was charged.

One hundred and thirty-five agencies participated in the sponsoring of these courses, including 49 medical schools, 41 special societies, 13 state medical societies, 12 hospitals, 11 health departments, 4 universities and county medical societies, and the United States Public Health Service.

There were 227 courses reported cancelled.

The attendance reported for 984 of the 1,074 courses given was 28,507. Attendance at courses by medical schools alone totaled 15,695.

*Clinical Conferences, Graduate Assemblies, Study Courses and Chautauqua Courses.*—In twenty-six states and the District of Columbia, 67 clinical conferences, graduate assemblies and study and chautauqua courses were held during 1948-1949. This type of training varied in length from one day sessions to two weeks for conferences, assemblies and study courses. In six states, chautauqua courses were held at various times throughout the states in four to twelve centers. Contributing agencies were speakers' bureaus, medical schools, state and county medical societies, state health departments and special societies. The majority surveyed topics in general medicine and surgery. Other subjects covered were cardiovascular disease, malignant diseases, obstetrics and gynecology, neurology and psychiatry, ophthalmology, therapy and venereal diseases. Instruction was both didactic and clinical. The facilities of hospitals, clinics and medical schools were used. The registration fees ranged from $3 to $75. They were given during every month except May and August. The attendance numbered 38,058.

*Summary.*—Some form of continuation study was provided during 1948-1949 in thirty-five states and the District of Columbia. Table 23 summarizes for these three groups the number of courses given, the number who reported attendance and the total attendance together with similar figures for the three previous years. While the attendance for the short review courses was less than that of last year, there was a

noticeable increase in attendance at longer courses, clinical conferences, graduate assemblies and study and chautauqua courses. The total for all three groups last year (83,386) represents the greatest number to seek such training in a given year. In 1945-1946 the attendance totaled 45,955; in 1946-1947 it was 59,811, and in 1947-1948 it was 82,803.

The offering of these opportunities indicates an expanding use of the facilities of medical schools and hospitals and deserves commendation.

## INTERNSHIPS AND RESIDENCIES

The following internships and residency training programs have been approved since the publication of the list of Approved Residencies and Fellowships in THE JOURNAL, May 14, 1949. A number of hospitals not included in this list have recently been surveyed by representatives of the Council and have been recommended for residency approval. These hospitals will be notified as soon as final action on their applications has been completed.

Information regarding these hospitals will appear in the next Internship and Residency Number of THE JOURNAL.

### ADDITIONAL INTERNSHIPS APPROVED

| | |
|---|---|
| Percy Jones General Hospital | Battle Creek, Mich. |
| Valley Forge General Hospital | Phoenixville, Pa. |
| Veterans Administration Hospital | Los Angeles |
| Memorial Hospital | Elmhurst, Ill. |
| Mercy Hospital | Oklahoma City |
| Rochester General Hospital | Rochester, Pa. |

### ADDITIONAL RESIDENCIES APPROVED

**Anesthesiology**

| | |
|---|---|
| American Hospital | Chicago |

**Dermatology and Syphilology**

| | |
|---|---|
| Employees' Hospital of the Tennessee Coal, Iron and Railroad Company | Fairfield, Ala. |
| Philadelphia General Hospital | Philadelphia |

**General Practice**

| | |
|---|---|
| Missouri Methodist Hospital | St. Joseph, Mo. |

**Internal Medicine**

| | |
|---|---|
| Veterans Administration Hospital | Lincoln, Neb. |
| City Hospital | Mobile, Ala. |

**Obstetrics and Gynecology**

| | |
|---|---|
| St. Vincent's Hospital | Bridgeport, Conn. |
| Hospital of St. Raphael | New Haven, Conn. |
| St. Luke's Hospital | Kansas City, Mo. |
| French Hospital | New York City |
| Jewish Memorial Hospital | New York City |
| Sydenham Hospital | New York City |
| United Hospital | Port Chester, N. Y. |
| St. Rita's Hospital | Lima, Ohio |
| St. Vincent's Hospital | Toledo, Ohio |

**Ophthalmology**

| | |
|---|---|
| Valley Forge General Hospital | Phoenixville, Pa. |
| Veterans Administration Hospital | Jefferson Barracks, Mo. |
| Arkansas Baptist Hospital | Little Rock, Ark. |
| Montefiore Hospital for Chronic Diseases | New York City |
| New York Hospital | New York City |
| Sea View Hospital | Staten Island, N. Y. |
| North Carolina Baptist Hospital | Winston-Salem, N. C. |

**Otolaryngology**

| | |
|---|---|
| Veterans Administration Hospital | Wadsworth, Kan. |
| Veterans Administration Hospital (West Roxbury) | Boston, Mass. |

**Pathology**

| | |
|---|---|
| Veterans Administration Hospital | Dayton, Ohio |
| St. Luke's Hospital | San Francisco |
| St. Mary of Nazareth Hospital | Chicago |
| Holyoke Hospital (1) | Holyoke, Mass. |
| Edward W. Sparrow Hospital | Lansing, Mich. |

**Pathology—Continued**

| | |
|---|---|
| Saginaw General Hospital | Saginaw, Mich. |
| St. Barnabas Hospital for Chronic Diseases (2) | New York City |
| United Hospital | Port Chester, N. Y. |
| Peoples Hospital | Akron, Ohio |
| St. Rita's Hospital | Lima, Ohio |
| Hospital of the Woman's Medical College of Pennsylvania | Philadelphia |

1. Affiliated with Bingham Associates Laboratory, Holyoke, Massachusetts.
2. Affiliated with St. Agnes Hospital, White Plains, New York.

**Pediatrics**

| | |
|---|---|
| Walter Reed General Hospital | Washington, D. C. |
| Children's Mercy Hospital | Kansas City, Mo. |
| Bayamon District Hospital | Bayamon, Puerto Rico |

**Psychiatry**

| | |
|---|---|
| Georgetown University Medical Center | Washington, D. C. |

**Pulmonary Diseases**

| | |
|---|---|
| Veterans Administration Hospital | Oteen, N. C. |

**Radiology**

| | |
|---|---|
| Veterans Administration Hospital | Wichita, Kan. |
| Veterans Administration Hospital | Columbia, S. C. |
| Veterans Administration Hospital | White River Jct., Vt. |
| St. Francis Hospital | San Francisco |
| St. Mary's Hospital | Waterbury, Conn. |
| Loretto Hospital | Chicago |
| Wesley Hospital | Wichita, Kan. |
| Eastern Maine General Hospital | Bangor, Maine |
| Cambridge City Hospital | Cambridge, Mass. |
| Leila Y. Post Montgomery Hospital | Battle Creek, Mich. |
| Lebanon Hospital | New York City |
| St. John's Hospital | Cleveland |
| Hospital of the Woman's Medical College of Pennsylvania | Philadelphia |
| Bishop Issiosbriland Hospital | Burlington, Vt. |

**Thoracic Surgery**

| | |
|---|---|
| Los Angeles Sanatorium | Duarte, Calif. |

**Urology**

| | |
|---|---|
| French Hospital | New York City |
| Jewish Hospital | Philadelphia |

## SURGERY

The services listed below are approved by the Council and the American Board of Surgery in accordance with the Board's recently announced training requirements (see Approved Examining Boards in the Specialties, page 86. Hospitals designated by an asterisk (*) offer training of less than three years in duration. Their programs, however, are integrated with accepted graded residencies and are approved as affiliating services.

| Name of Hospital | Location | Length of Approved Program, Years |
|---|---|---|
| **United States Army** | | |
| Letterman General Hospital | San Francisco | 3-4 |
| Fitzsimons General Hospital | Denver | 3-4 |
| Walter Reed General Hospital | Washington, D. C. | 3-4 |
| Oliver General Hospital | Augusta, Ga. | 3-4 |
| Brooke General Hospital | San Antonio, Texas | 3-4 |
| Gorgas Hospital | Ancon, C. Z. | 3-4 |
| **United States Navy** | | |
| U. S. Naval Hospital | Long Beach, Calif. | 4 |
| U. S. Naval Hospital | Oakland, Calif. | 4 |
| U. S. Naval Hospital | San Diego | 4 |
| **United States Navy—Continued** | | |
| U. S. Naval Hospital | Great Lakes, Ill. | * |
| U. S. Naval Hospital | Bethesda, Md. | 4 |
| U. S. Naval Hospital | Chelsea, Mass. | 4 |
| U. S. Naval Hospital | St. Alban's, New York | 4 |
| U. S. Naval Hospital | Philadelphia | 4 |
| **United States Public Health Service** | | |
| U. S. Marine Hospital | San Francisco | 3 |
| U. S. Marine Hospital | New Orleans | 3 |
| U. S. Marine Hospital | Baltimore | 3 |

## SURGERY—Continued

| Name of Hospital | Location | Length of Approved Program, Years |
|---|---|---|
| **United States Public Health Service—Continued** | | |
| U. S. Marine Hospital | Boston | 3 |
| U. S. Marine Hospital | Detroit | 3 |
| U. S. Marine Hospital | Stapleton, S. I., N. Y. | 3 |
| U. S. Marine Hospital | Seattle | 3 |
| **Federal Security Agency** | | |
| Freedmen's Hospital | Washington, D. C. | 4 |
| **Veterans Administration** | | |
| Veterans Administration Center | Los Angeles | 3-4 |
| Veterans Administration Hospital | San Francisco | 3-4 |
| Veterans Administration Hospital | Van Nuys, Calif. | 3-4 |
| Veterans Administration Hospital | Fort Logan, Colo. | 3-4 |
| Veterans Administration Hospital | Newington, Conn. | 3-4 |
| Veterans Administration Hospital | Washington, D. C. | 3-4 |
| Veterans Administration Hospital | Coral Gables, Fla. | 3 |
| Veterans Administration Hospital | Chamblee, Ga. | 3-4 |
| Veterans Administration Hospital | Hines, Ill. | 4 |
| Veterans Administration Hospital | Indianapolis | 4 |
| Veterans Administration Center | Des Moines, Iowa | 3-4 |
| Veterans Administration Center | Wadsworth, Kan. | 3-4 |
| Veterans Administration Hospital | Louisville, Ky. | 4 |
| Veterans Administration Hospital | New Orleans | 3-4 |
| Veterans Administration Hospital | Fort Howard, Md. | 4 |
| Veterans Administration Hospital | Perry Point, Md. | 4 |
| Veterans Administration Hospital (West Roxbury) | Boston | 3-4 |
| Veterans Administration Hospital | Framingham, Mass. | 4 |
| Veterans Administration Hospital | Dearborn, Mich. | 3-4 |
| Veterans Administration Hospital | Minneapolis | 3-4 |
| Veterans Administration Hospital | Jefferson Bks., Mo. | 4 |
| Veterans Administration Hospital | Lincoln, Neb. | 3 |
| Veterans Administration Hospital | Albuquerque, N. M. | 3 |
| Veterans Administration Hospital | Batavia, N. Y. | 3 |
| Veterans Administration Hospital | New York City | 3-4 |
| Veterans Administration Hospital | Staten Island, N. Y. | 3-4 |
| Veterans Administration Hospital | Cleveland | 3-4 |
| Veterans Administration Center | Dayton, Ohio | 4 |
| Veterans Administration Hospital | Oklahoma City | 3-4 |
| Veterans Administration Hospital | Portland, Oregon | 3-4 |
| Veterans Administration Hospital | Aspinwall, Pa. | 3-4 |
| Veterans Administration Hospital | Columbia, S. C. | 3-4 |
| Veterans Administration Hospital | Memphis, Tenn. | 3-4 |
| Veterans Administration Hospital | Nashville, Tenn. | 4 |
| Veterans Administration Hospital | Dallas, Texas | 3-4 |
| Veterans Administration Hospital | Houston, Texas | 4 |
| Veterans Administration Hospital | McKinney, Texas | 4 |
| Veterans Administration Hospital | Salt Lake City | 3 |
| Veterans Administration Center | White River Jct., Vt. | 4 |
| Veterans Administration Hospital | Richmond, Va. | 4 |
| Veterans Administration Center | Milwaukee | 3-4 |
| **Nonfederal** | | |
| Jefferson-Hillman Hospital | Birmingham, Ala. | 4 |
| Carraway Methodist Hospital | Birmingham, Ala. | 3 |
| Employees' Hospital of the Tenn. Coal, Iron & R. R. Co. | Fairfield, Ala. | 4 |
| University Hospital | Little Rock, Ark. | 4 |
| San Joaquin General Hospital | French Camp, Calif. | 3 |
| General Hospital of Fresno Co. | Fresno, Calif. | 3 |
| Cedars of Lebanon Hospital | Los Angeles | 3 |
| Hospital of the Good Samaritan | Los Angeles | 3 |
| Los Angeles County Hospital | Los Angeles | 4 |
| White Memorial Hospital | Los Angeles | 3 |
| Highland-Alameda Co. Hospital | Oakland, Calif. | 3 |
| San Bernadino County Charity Hosp. | San Bernadino, Calif. | 3 |
| Mercy Hospital | San Diego, Calif. | 3 |
| San Diego County General Hospital | San Diego, Calif. | 3 |
| Franklin Hospital | San Francisco | 4 |
| Mount Zion Hospital | San Francisco | 4 |
| San Francisco Hospital | San Francisco | 4 |
| Southern Pacific General Hospital | San Francisco | 3 |
| Stanford University Hospital | San Francisco | 4 |
| University of California Hospital | San Francisco | 4 |
| Santa Barbara Cottage Hospital | Santa Barbara, Calif. | 3 |
| Los Angeles County Harbor General Hospital | Torrance, Calif. | 3 |
| Presbyterian Hospital | Denver | 3 |
| St. Joseph's Hospital | Denver | 3 |
| St. Luke's Hospital | Denver | 3 |
| University of Colorado Medical Center Colorado General Hospital | Denver | 4 |
| Denver General Hospital | Denver | 4 |
| Corwin Hospital | Pueblo, Colo. | 3 |
| Bridgeport Hospital | Bridgeport, Conn. | 3 |
| Hartford Hospital | Hartford, Conn. | 4 |
| St. Francis Hospital | Hartford, Conn. | 3 |
| New Britain General Hospital | New Britain, Conn. | 3 |
| Grace-New Haven Community Hospital Grace Unit | New Haven, Conn. | 4 |
| New Haven Unit | New Haven, Conn. | 4 |
| Hospital of St. Raphael | New Haven, Conn. | 4 |
| Delaware Hospital | Wilmington, Del. | 4 |
| Memorial Hospital | Wilmington, Del. | 3 |
| Central Dispensary and Emergency Hospital | Washington, D. C. | 4 |
| Gallinger Municipal Hospital | Washington, D. C. | 4 |
| Garfield Memorial Hospital | Washington, D. C. | 3 |
| Georgetown University Hospital | Washington, D. C. | 4 |
| George Washington University Hospital | Washington, D. C. | 4 |
| Providence Hospital | Washington, D. C. | 3 |
| Duval Medical Center | Jacksonville, Fla. | 4 |
| St. Vincent's Hospital | Jacksonville, Fla. | 3 |
| Jackson Memorial Hospital | Miami, Fla. | 3 |
| Crawford W. Long Memorial Hospital | Atlanta, Ga. | 3 |
| Grady Memorial Hospital | Atlanta, Ga. | 4 |
| University Hospital | Augusta, Ga. | 3 |
| Emory University Hospital | Emory University, Ga. | 3 |
| American Hospital | Chicago | 3 |
| Augustana Hospital | Chicago | 4 |
| Chicago Memorial Hospital | Chicago | 3 |
| Children's Memorial Hospital | Chicago | * |
| Cook County Hospital | Chicago | 4 |
| Grant Hospital | Chicago | 3 |
| Illinois Masonic Hospital | Chicago | 3 |
| Michael Reese Hospital | Chicago | 4 |
| Mount Sinai Hospital | Chicago | 3 |
| Passavant Memorial Hospital | Chicago | 4 |
| Presbyterian Hospital | Chicago | 4 |
| Provident Hospital | Chicago | 3 |
| Research and Educational Hospitals | Chicago | 4 |
| St. Elizabeth Hospital | Chicago | 3 |
| St. Luke's Hospital | Chicago | 4 |
| St. Mary of Nazareth Hospital | Chicago | 3 |
| University of Chicago Clinics | Chicago | 4 |
| Wesley Memorial Hospital | Chicago | 4 |
| Evanston Hospital | Evanston, Ill. | 4 |
| West Suburban Hospital | Oak Park, Ill. | 3 |
| Indianapolis General Hospital | Indianapolis | 3 |
| Indiana University Medical Center | Indianapolis | 4 |
| St. Elizabeth Hospital | La Fayette, Ind. | 3 |
| Iowa Methodist Hospital | Des Moines, Iowa | 3 |
| University Hospital | Iowa City | 4 |
| University of Kansas Medical Center | Kansas City, Kan. | 4 |
| Wesley Hospital | Wichita, Kan. | 3 |
| Louisville General Hospital | Louisville, Ky. | 4 |
| Norton Memorial Infirmary | Louisville, Ky. | * |
| St. Joseph Infirmary | Louisville, Ky. | 4 |
| Charity Hospital of Louisiana | New Orleans | 4 |
| Ochsner Foundation Hospital | New Orleans | 3 |
| Southern Baptist Hospital | New Orleans | 3 |
| Touro Infirmary | New Orleans | 3 |
| Shreveport Charity Hospital | Shreveport, La. | 3 |
| Maine General Hospital | Portland, Maine | 3 |
| Baltimore City Hospitals | Baltimore | 3 |
| Church Home and Hospital | Baltimore | 3 |
| Franklin Square Hospital | Baltimore | 4 |
| Johns Hopkins Hospital | Baltimore | 4 |
| Maryland General Hospital | Baltimore | 3 |
| Mercy Hospital | Baltimore | 4 |
| Provident Hospital and Free Dispensary | Baltimore | 3 |
| St. Agnes Hospital | Baltimore | 3 |
| Sinai Hospital | Baltimore | 4 |
| South Baltimore General Hospital | Baltimore | 3 |
| Union Memorial Hospital | Baltimore | 4 |
| University Hospital | Baltimore | 4 |
| West Baltimore General Hospital | Baltimore | 3 |
| Beth Israel Hospital | Boston | 4 |
| Beverly Hospital | Beverly, Mass. | 3 |
| Boston City Hospital | Boston | 4 |
| Carney Hospital | Boston | 3 |
| Children's Hospital | Boston | * |
| Massachusetts General Hospital | Boston | 4 |
| Massachusetts Memorial Hospitals | Boston | 4 |
| New England Hospital for Women and Children | Boston | 3 |
| Peter Bent Brigham Hospital | Boston | 4 |
| St. Elizabeth's Hospital | Boston | 3 |
| Truesdale Hospital | Fall River, Mass. | * |
| Newton-Wellesley Hospital | Newton, Mass. | 3 |
| Salem Hospital | Salem, Mass. | * |
| Memorial Hospitals | Worcester, Mass. | 3 |
| St. Vincent Hospital | Worcester, Mass. | 3 |
| St. Joseph's Mercy Hospital | Ann Arbor, Mich. | 3 |
| University Hospital | Ann Arbor, Mich. | 4 |
| Leila Y. Post Montgomery Hospital | Battle Creek, Mich. | 3 |
| Alexander Blain Hospital | Detroit | 3 |
| City of Detroit Receiving Hospital | Detroit | 3 |
| Evangelical Deaconess Hospital | Detroit | 3 |
| Grace Hospital | Detroit | 3 |
| Harper Hospital | Detroit | 3 |
| Henry Ford Hospital | Detroit | 4 |
| Providence Hospital | Detroit | 3 |
| St. Joseph's Mercy Hospital | Detroit | 3 |
| St. Mary's Hospital | Detroit | 3 |
| Wayne County General Hospital and Infirmary | Eloise, Mich. | 3 |
| Hurley Hospital | Flint, Michigan | 3 |
| Blodgett Memorial Hospital | Grand Rapids, Mich. | 3 |
| Butterworth Hospital | Grand Rapids, Mich. | 4 |
| St. Mary's Hospital | Grand Rapids, Mich. | 3 |
| Highland Park General Hospital | Highland Park, Mich. | 3 |
| Bronson Methodist Hospital | Kalamazoo, Mich. | 3 |
| Pontiac General Hospital | Pontiac, Mich. | 3 |
| Saginaw General Hospital | Saginaw, Mich. | 3 |
| Minneapolis General Hospital | Minneapolis | 3 |
| Northwestern Hospital | Minneapolis | 3 |
| St. Barnabas Hospital | Minneapolis | * |

## SURGERY—Continued

| Name of Hospital | Location | Length of Approved Program, Years |
|---|---|---|
| **Nonfederal—Continued** | | |
| University of Minnesota Hospitals | Minneapolis | 4 |
| Mayo Foundation | Rochester, Minn. | 3 |
| Ancker Hospital | St. Paul | 3 |
| Charles T. Miller Hospital | St. Paul | 3 |
| Lutheran Hospital | Vicksburg, Miss. | 3 |
| Kansas City General Hospital No. 1 | Kansas City, Mo. | 3 |
| St. Joseph Hospital | Kansas City, Mo. | 3 |
| St. Luke's Hospital | Kansas City, Mo. | 3 |
| Barnes Hospital | St. Louis | 4 |
| Homer G. Phillips Hospital | St. Louis | 4 |
| Jewish Hospital | St. Louis | 3 |
| Missouri Baptist Hospital | St. Louis | 3 |
| St. John's Hospital | St. Louis | 3 |
| St. Louis City Hospital | St. Louis | 4 |
| St. Mary's Group of Hospitals | St. Louis | 3 |
| Bishop Clarkson Memorial Hospital | Omaha | 3 |
| Creighton Memorial St. Joseph's Hosp. | Omaha | 3 |
| Nebraska Methodist Hospital | Omaha | * |
| University of Nebraska Hospital | Omaha | 3 |
| Cooper Hospital | Camden, N. J. | 3 |
| West Jersey Hospital | Camden, N. J. | 3 |
| Jersey City Hospital | Jersey City, N. J. | 3 |
| Hospital of St. Barnabas and for Women and Children | Newark, N. J. | 3 |
| Newark Beth Israel Hospital | Newark, N. J. | 3 |
| Albany Hospital | Albany, N. Y. | 3 |
| Binghamton City Hospital | Binghamton, N. Y. | 3 |
| Beth El Hospital | Brooklyn | 3 |
| Brooklyn Hospital | Brooklyn | 3 |
| Cumberland Hospital | Brooklyn | 4 |
| Jewish Hospital | Brooklyn | 4 |
| Kings County Hospital | Brooklyn | 4 |
| Long Island College Hospital | Brooklyn | 4 |
| Maimonides Hospital | Brooklyn | 3 |
| Methodist Hospital | Brooklyn | 3 |
| Norwegian Lutheran Deaconesses' Home and Hospital | Brooklyn | 3 |
| St. Catherine's Hospital | Brooklyn | 3 |
| St. John's Hospital | Brooklyn | 3 |
| Wyckoff Heights Hospital | Brooklyn | 3 |
| Buffalo General Hospital | Buffalo | 3 |
| Edward J. Meyer Memorial Hospital | Buffalo | 4 |
| Millard Fillmore Hospital | Buffalo | 3 |
| Clifton Springs Sanitarium and Clinic | Clifton Springs, N. Y. | 3 |
| Mary Imogene Bassett Hospital | Cooperstown, N. Y. | 3 |
| Jamaica Hospital | Jamaica, N. Y. | 3 |
| Queens General Hospital | Jamaica, N. Y. | 4 |
| Charles S. Wilson Memorial Hospital | Johnson City, N. Y. | 3 |
| Nassau Hospital | Mineola, N. Y. | 3 |
| New Rochelle Hospital | New Rochelle, N. Y. | 3 |
| Bellevue Hospital | | |
| Div. I—Columbia University | New York City | 3 |
| Div. II—Cornell University | New York City | 4 |
| Div. III—New York University | New York City | 4 |
| Div. IV—Open Division | New York City | 4 |
| Beth Israel Hospital | New York City | 3 |
| Bronx Hospital | New York City | 3 |
| Flower and Fifth Avenue Hospitals | New York City | 4 |
| French Hospital | New York City | 3 |
| Goldwater Memorial Hospital, III Surgical Service | New York City | 4 |
| Harlem Hospital | New York City | 3 |
| Lenox Hill Hospital | New York City | 3 |
| Lincoln Hospital | New York City | 3 |
| Metropolitan Hospital | New York City | 4 |
| Montefiore Hospital for Chronic Diseases | New York City | 3 |
| New York City Hospital | New York City | 3 |
| New York Hospital | New York City | 4 |
| New York Polyclinic Medical School and Hospital | New York City | 3 |
| Presbyterian Hospital | New York City | 4 |
| Roosevelt Hospital | New York City | 4 |
| St. Clare's Hospital | New York City | 3 |
| St. Luke's Hospital | New York City | 4 |
| St. Vincent's Hospital | New York City | 4 |
| University Hospital | New York City | 4 |
| Genesee Hospital | Rochester, N. Y. | 4 |
| Highland Hospital | Rochester, N. Y. | 3 |
| Rochester General Hospital | Rochester, N. Y. | 3 |
| Strong Memorial-Rochester Municipal Hospitals | Rochester, N. Y. | 4 |
| Ellis Hospital | Schenectady, N. Y. | 3 |
| Hospital of the Good Shepherd | Syracuse, N. Y. | 3 |
| Grasslands Hospital | Valhalla, N. Y. | 3 |
| Duke Hospital | Durham, N. C. | 4 |
| Watts Hospital | Durham, N. C. | 3 |
| North Carolina Baptist Hospital | Winston-Salem, N. C. | 4 |
| City Hospital | Akron, Ohio | 4 |
| Peoples Hospital | Akron, Ohio | 4 |
| St. Thomas Hospital | Akron, Ohio | 3 |
| Aultman Hospital | Canton, Ohio | 3 |
| Mercy Hospital | Canton, Ohio | 3 |
| Cincinnati General Hospital | Cincinnati | 4 |
| Jewish Hospital | Cincinnati | 4 |
| St. Mary's Hospital | Cincinnati | 3 |
| City Hospital | Cleveland | 4 |
| Cleveland Clinic Hospital | Cleveland | 3 |
| Lutheran Hospital | Cleveland | 4 |
| Mount Sinai Hospital | Cleveland | 4 |
| St. Alexis Hospital | Cleveland | 3 |
| St. John's Hospital | Cleveland | 4 |
| St. Luke's Hospital | Cleveland | 4 |
| St. Vincent Charity Hospital | Cleveland | 3 |
| University Hospitals | Cleveland | 4 |
| Mount Carmel Hospital | Columbus, Ohio | 3 |
| Ohio State University Hospital | Columbus, Ohio | 4 |
| St. Francis Hospital | Columbus, Ohio | * |
| White Cross Hospital | Columbus, Ohio | 3 |
| Miami Valley Hospital | Dayton, Ohio | 3 |
| Huron Road Hospital | East Cleveland, Ohio | 3 |
| Lakewood Hospital | Lakewood, Ohio | 3 |
| St. Rita's Hospital | Lima, Ohio | 3 |
| Mercy Hospital | Toledo, Ohio | 3 |
| St. Vincent's Hospital | Toledo, Ohio | 3 |
| Toledo Hospital | Toledo, Ohio | 3 |
| St. Elizabeth's Hospital | Youngstown, Ohio | 4 |
| Youngstown Hospital | Youngstown, Ohio | 4 |
| University Hospitals | Oklahoma City | 3 |
| Hillcrest Memorial Hospital | Tulsa, Okla. | 3 |
| Emanuel Hospital | Portland, Ore. | 3 |
| Good Samaritan Hospital | Portland, Ore. | 3 |
| St. Vincent's Hospital | Portland, Ore. | 3 |
| University of Oregon Medical School Hospitals and Clinics | Portland, Ore. | 4 |
| Abington Memorial Hospital | Abington, Pa. | 3 |
| St. Luke's Hospital | Bethlehem, Pa. | 3 |
| Bradford Hospital | Bradford, Pa. | * |
| Bryn Mawr Hospital | Bryn Mawr, Pa. | 3 |
| George F. Geisinger Memorial Hospital | Danville, Pa. | 3 |
| St. Vincent's Hospital | Erie, Pa. | 3 |
| Graduate Hospital of the University of Pennsylvania | Philadelphia | 3 |
| Hospital of the University of Pennsylvania | Philadelphia | 4 |
| Jefferson Medical College Hospitals | Philadelphia | 4 |
| Jewish Hospital | Philadelphia | 3 |
| Lankenau Hospital | Philadelphia | 3 |
| Mount Sinai Hospital | Philadelphia | 3 |
| Pennsylvania Hospital | Philadelphia | 4 |
| Philadelphia General Hospital | Philadelphia | 4 |
| Presbyterian Hospital | Philadelphia | 3 |
| Temple University Hospital | Philadelphia | 3 |
| Woman's Hospital | Philadelphia | 3 |
| Children's Hospital | Pittsburgh | * |
| Mercy Hospital | Pittsburgh | 3 |
| Montefiore Hospital | Pittsburgh | 3 |
| Pittsburgh Hospital | Pittsburgh | 3 |
| Presbyterian Hospital | Pittsburgh | 3 |
| St. Francis Hospital | Pittsburgh | 3 |
| Western Pennsylvania Hospital | Pittsburgh | 3 |
| Robert Packer Hospital | Sayre, Pa. | 3 |
| York Hospital | York, Pa. | 3 |
| Rhode Island Hospital | Providence, R. I. | 3 |
| Roper Hospital | Charleston, S.C. | 4 |
| Columbia Hospital | Columbia, S.C. | 3 |
| Baroness Erlanger Hospital | Chattanooga, Tenn. | 4 |
| Knoxville General Hospital | Knoxville, Tenn. | 3 |
| John Gaston Hospital | Memphis, Tenn. | 4 |
| Methodist Hospital | Memphis, Tenn. | 3 |
| Nashville General Hospital | Nashville, Tenn. | 3 |
| St. Thomas Hospital | Nashville, Tenn. | 4 |
| Vanderbilt University Hospital | Nashville, Tenn. | 4 |
| Baylor University Hospital | Dallas, Texas | 3 |
| Gaston Hospital | Dallas, Texas | * |
| Parkland Hospital | Dallas, Texas | 3 |
| University of Texas Medical Branch Hospitals | Galveston, Texas | 4 |
| Jefferson Davis Hospital | Houston, Texas | 4 |
| Methodist Hospital | Houston, Texas | * |
| Scott and White Hospital | Temple, Texas | 3 |
| Wichita Falls Clinic Hospital | Wichita Falls, Texas | 3 |
| Dr. W. H. Groves Latter-Day Saints Hospital | Salt Lake City | 3 |
| Holy Cross Hospital | Salt Lake City | * |
| St. Mark's Hospital | Salt Lake City | 3 |
| Salt Lake County General Hospital | Salt Lake City | 4 |
| Mary Fletcher Hospital | Burlington, Vt. | 3 |
| Alexandria Hospital | Alexandria, Va. | 3 |

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## SURGERY—Continued

| Name of Hospital | Location | Length of Approved Program, Years |
|---|---|---|
| **Nonfederal—Continued** | | |
| University of Virginia Hospital | Charlottesville, Va. | 3 |
| Chesapeake and Ohio Hospital | Clifton Forge, Va. | 3 |
| Norfolk General Hospital | Norfolk, Va. | 3 |
| Medical College of Virginia Hosp. Div. | Richmond, Va. | 4 |
| King County Hospital Unit No. 1 (Harborview) | Seattle | 3 |
| Virginia Mason Hospital | Seattle | 3 |
| Beckley Hospital | Beckley, W. Va. | 3 |
| Charleston General Hospital | Charleston, W. Va. | 3 |
| Laird Memorial Hospital | Montgomery, W. Va. | 3 |
| St. Joseph's Hospital | Parkersburg, W. Va. | 3 |
| Madison General Hospital | Madison, Wis. | 3 |
| State of Wisconsin General Hospital | Madison, Wis. | 3 |
| Columbia Hospital | Milwaukee | 3 |
| Evangelical Deaconess Hospital | Milwaukee | 3 |
| Milwaukee Children's Hospital | Milwaukee | * |
| Milwaukee Hospital | Milwaukee | 3 |
| Milwaukee County Hospital | Milwaukee | 3 |
| St. Joseph's Hospital | Milwaukee | 3 |
| San Juan City Hospital | San Juan, Puerto Rico | 3 |

The following services are approved by the Council as offering satisfactory training programs of one or two years in preparation for residency training in the surgical specialties. (As previously announced, training in hospitals listed in the Internship and Residency Number of THE JOURNAL, May 14, 1949, as approved for surgical residencies will be accepted by the American Board of Surgery through July 1, 1950.)

St. Joseph's Hospital.....Phoenix, Ariz.
Tucson Medical Center.....Tucson, Ariz.
Arkansas Baptist Hospital.....Little Rock, Ark.
St. Vincent Infirmary.....Little Rock, Ark.
Herrick Memorial Hospital.....Berkeley, Calif.
Seaside Memorial Hospital...Long Beach, Calif.
California Hospital.....Los Angeles
Queen of Angels Hospital.....Los Angeles
St. Vincent's Hospital.....Los Angeles
Santa Fe Coast Lines Hospital.....Los Angeles
Peralta Hospital.....Oakland, Calif.
Permanente Foundation Hosp...Oakland, Calif.
Samuel Merritt Hospital.....Oakland, Calif.
Collis P. and Howard Huntington Memorial Hospital.....Pasadena, Calif.
Children's Hospital.....San Francisco
French Hospital.....San Francisco
Mary's Help Hospital.....San Francisco
St. Luke's Hospital.....San Francisco
St. Mary's Hospital.....San Francisco
Santa Clara County Hospital..San Jose, Calif.
St. John's Hospital.....Santa Monica, Calif.
Children's Hospital.....Denver
Lawrence and Memorial Associated Hospitals.....New London, Conn.
Norwalk Hospital.....Norwalk, Conn.
Wilmington General Hospital..Wilmington, Del.
Doctors Hospital.....Washington, D. C.
Sibley Memorial Hospital....Washington, D. C.
Riverside Hospital.....Jacksonville, Fla.
St. Luke's Hospital.....Jacksonville, Fla.
Georgia Baptist Hospital.....Atlanta, Ga.
Piedmont Hospital.....Atlanta, Ga.
St. Joseph's Infirmary.....Atlanta, Ga.
Henrotin Hospital.....Chicago
Hospital of St. Anthony de Padua.....Chicago
Illinois Central Hospital.....Chicago
Lutheran Deaconess Home and Hosp...Chicago
Mercy Hospital.....Chicago
Norwegian-American Hospital.....Chicago
Ravenswood Hospital.....Chicago
St. Anne's Hospital.....Chicago
St. Joseph Hospital.....Chicago
Women and Children's Hospital.....Chicago
Woodlawn Hospital.....Chicago
St. Francis Hospital.....Evanston, Ill.
Little Company of Mary Hospital.....Evergreen Park, Ill.
St. Francis Hospital.....Peoria, Ill.
Methodist Hospital.....Indianapolis
St. Vincent's Hospital.....Indianapolis
Ball Memorial Hospital.....Muncie, Ind.
St. Margaret's Hospital.....Kansas City, Kan.
St. Francis Hospital.....Wichita, Kan.
St. Joseph's Hospital.....Lexington, Ky.
Hotel Dieu, Sisters' Hospital.....New Orleans
Bon Secours Hospital.....Baltimore
Hospital for Women.....Baltimore
St. Joseph's Hospital.....Baltimore
Suburban Hospital.....Bethesda, Md.
Lahey Clinic.....Boston
Cambridge City Hospital.....Cambridge, Mass.
Mount Auburn Hospital.....Cambridge, Mass
Lynn Hospital.....Lynn, Mass.
Malden Hospital.....Malden, Mass.
Quincy City Hospital.....Quincy, Mass.
Worcester City Hospital.....Worcester, Mass.
Charles Godwin Jennings Hospital.....Detroit
Mount Carmel Mercy Hospital.....Detroit
Woman's Hospital.....Detroit
St. Luke's Hospital.....Duluth, Minn.
St. Mary's Hospital.....Duluth, Minn.
Asbury Hospital.....Minneapolis
Lutheran Deaconess Home and Hospital.....Minneapolis
Swedish Hospital.....Minneapolis
Mercy Hospital-Street Memorial..Vicksburg, Miss.
St. Louis County Hospital.....Clayton, Mo.
Ellis Fischel State Cancer Hosp...Columbia, Mo.
Menorah Hospital.....Kansas City, Mo.
Research Hospital.....Kansas City, Mo.
St. Mary's Hospital.....Kansas City, Mo.
De Paul Hospital.....St. Louis
Missouri Pacific Hospital.....St. Louis
St. Anthony's Hospital.....St. Louis
St. Luke's Hospital.....St. Louis
Montana Deaconess Hosp...Great Falls, Mont.
Atlantic City Hospital.....Atlantic City, N. J.
Hackensack Hospital.....Hackensack, N. J.
Mountainside Hospital.....Montclair, N. J.
Burlington County Hosp....Mount Holly, N. J.
Fitkin Memorial Hospital.....Neptune, N. J.
Presbyterian Hospital.....Newark, N. J.
Paterson General Hospital.....Paterson, N. J.
St. Francis Hospital.....Trenton, N. J.
Brooklyn Cancer Institute.....Brooklyn
Coney Island Hospital.....Brooklyn
Greenpoint Hospital.....Brooklyn
St. Mary's Hospital.....Brooklyn
Children's Hospital.....Buffalo
Deaconess Hospital.....Buffalo
Sisters of Charity Hospital.....Buffalo
Mary McClellan Hospital.....Cambridge, N. Y.
Meadowbrook Hospital.....Hempstead, N. Y.
Mary Immaculate Hospital.....Jamaica, N. Y.
Mount Vernon Hospital...Mount Vernon, N. Y.
Fordham Hospital.....New York City
Hospital for Special Surgery....New York City
Knickerbocker Hospital.....New York City
Morrisania City Hospital.....New York City
Mount Sinai Hospital.....New York City
New York Infirmary.....New York City
Sydenham Hospital.....New York City
St. Mary's Hospital.....Rochester, N. Y.
White Plains Hospital.....White Plains, N. Y.
Charlotte Memorial Hospital..Charlotte, N. C.
James Walker Memorial Hospital.....Wilmington, N. C.
City Memorial Hospital...Winston-Salem, N. C.
Kate Bitting Reynolds Memorial Hospital.....Winston-Salem, N. C.
Bismarck Evangelical Hospital..Bismarck, N. D.
St. Luke's Hospital.....Fargo, N. D.
Trinity Hospital.....Minot, N. D.
Children's Hospital.....Akron, Ohio
Christ Hospital.....Cincinnati
Deaconess Hospital.....Cincinnati
Good Samaritan Hospital.....Cincinnati
Fairview Park Hospital.....Cleveland
Mercy Hospital.....Hamilton, Ohio
St. Anthony Hospital.....Oklahoma City
St. John's Hospital.....Tulsa, Okla.
Portland Sanitarium and Hosp..Portland, Ore.
Providence Hospital.....Portland, Ore.
Allentown Memorial Hospital....Allentown, Pa.
Sacred Heart Hospital.....Allentown, Pa.
Hamot Hospital.....Erie, Pa.
Harrisburg Hospital.....Harrisburg, Pa.
St. Joseph's Hospital.....Lancaster, Pa.
Episcopal Hospital.....Philadelphia
Frankford Hospital.....Philadelphia
Germantown Dispensary and Hospital.....Philadelphia
Hahnemann Hospital.....Philadelphia
Hospital of the Woman's Medical College of Pennsylvania.....Philadelphia
Allegheny General Hospital.....Pittsburgh
Reading Hospital.....Reading, Pa.
St. Joseph's Hospital.....Reading, Pa.
Washington Hospital.....Washington, Pa.
Mercy Hospital.....Wilkes-Barre, Pa.
Wilkes-Barre General Hosp....Wilkes-Barre, Pa.
Williamsport Hospital.....Williamsport, Pa.
St. Joseph Hospital.....Memphis, Tenn.
George W. Hubbard Hospital of Meharry Medical College...Nashville, Tenn.
Methodist Hospital.....Dallas, Texas
St. Paul's Hospital.....Dallas, Texas
Harris Hospital.....Fort Worth, Texas
Hermann Hospital.....Houston, Texas
Memorial Hospital.....Houston, Texas
St. Joseph Infirmary.....Houston, Texas
Southern Pacific Hospital.....Houston, Texas
Thomas D. Dee Memorial Hosp....Ogden, Utah
Bishop DeGoesbriand Hospital..Burlington, Vt.
Arlington Hospital.....Arlington, Va.
De Paul Hospital.....Norfolk, Va.
Johnston-Willis Hospital.....Richmond, Va.
Jefferson Hospital.....Roanoke, Va.
Doctors Hospital.....Seattle
Providence Hospital.....Seattle
Swedish Hospital.....Seattle
St. Luke's Hospital.....Spokane
Chesapeake and Ohio Hospital.....Huntington, W. Va.
St. Mary's Hospital.....Huntington, W. Va.
Myers Clinic Hospital.....Philippi, W. Va.
La Crosse Lutheran Hospital..La Crosse, Wis.
Methodist Hospital.....Madison, Wis.
St. Mary's Hospital.....Madison, Wis.
Mount Sinai Hospital.....Milwaukee
St. Luke's Hospital.....Milwaukee
St. Mary's Hospital.....Milwaukee
Queen's Hospital.....Honolulu, Hawaii

# ESSENTIALS OF AN APPROVED INTERNSHIP

**Prepared by the Council on Medical Education and Hospitals of the American Medical Association**

**(Revised to December 1948)**

## I. Introduction

1. The primary function of a hospital is to provide facilities where the sick and injured may be given scientific medical care.

2. The operation of a well organized, effective program for the training of interns enhances the quality of care rendered to the sick and in nowise conflicts with the chief purpose for which the hospital is maintained.

3. The internship is one of the most important phases of medical education. The purpose of the internship is to supplement the undergraduate medical course by a well rounded experience of closely supervised clinical practice in diagnosis and therapy. There should be a progressive increase in the intern's responsibilities.

4. Hospitals which are approved for the training of interns accept a serious responsibility to their interns and to the communities in which they may later practice. Internships designed without a well supervised educational program, or arranged merely to provide hospitals with resident personnel to assist in the clinical work of the hospital, cannot be approved.

5. It is recognized that while some hospitals may be unable to meet the educational standards for intern training as set forth in these Essentials, they may be able to offer experience of some value to young physicians who have previously completed an approved internship. These hospitals may consider the appointment of paid house officers to assist in conducting the professional work of the hospital.

## II. The Internship

1. Basis of the Internship.—Under careful supervision the intern participates in the care of patients and receives in return instruction from the hospital staff in the clinical and laboratory aspects of his profession.

2. Length of Internship.—An internship should be of not less than twelve months' duration. Longer periods of service are preferable because they permit a more satisfactory educational program and allow the intern sufficient time in which to be trained adequately to assume increasing responsibility in various fields of medicine.

3. Types of Internship.—The Council approves "rotating," "mixed" and "straight" internships.

It is the opinion of the Council that a well organized rotating internship is likely to provide the best basic training for either the future general practitioner or the specialist.[1]

A rotating internship is defined as one which provides supervised experience in internal medicine, surgery, pediatrics, obstetrics and their related subspecialties. Supervised experience in laboratory and radiologic diagnosis should be included.

In rotating internships of a year's duration the time allotted to internal medicine should equal or exceed the time given to any other service. Too frequent a rotation of assignments or assignment to more than one service at a time is undesirable. No assignment should be for less than two months' duration. Arrangements should be made so that each intern devotes at least three consecutive months respectively to internal medicine and to surgery.

A mixed internship is defined as one which provides supervised experience in two or more, but not in all, of the clinical divisions named.

A straight internship is defined as one which provides supervised experience in a single department, although it may include limited opportunity for work in a related subspecialty. Straight internships are now approved in internal medicine, surgery, pediatrics, obstetrics (with or without gynecology) and pathology. To offer satisfactory straight internships a hospital should be able to maintain approved residencies in the specialties involved.

Except where otherwise specified the material in the following sections applies equally to rotating, mixed and straight internships.

1. Thirteen states now require a rotating internship for licensure.

## III. Hospitals Eligible for Approved Internships

The experience of the Council indicates that an acceptable rotating internship can be offered only in a general hospital registered by the American Medical Association, admitting at least 2,500 patients or more per year, having an average daily census of at least 85 patients, exclusive of the newborn, and providing a sufficient number and variety of patients in the several branches of medicine in which it undertakes to train interns. For the purpose of this section, patients who are not available to the interns for clinical study are not included.

Hospitals which are unable to meet all the requirements for approval and yet are able to offer satisfactory training for a limited period in one or more of the major clinical divisions, may establish affiliated programs with approved institutions. Such periods of training on an affiliating basis should not exceed 3 months in a 12 months' plan or 6 months in a 24 months' plan.

Separate approval is not extended to hospitals participating in a training program on an affiliating basis. Consideration is given to the affiliation in extending official approval to the parent institution sponsoring the plan. Recognition of affiliated hospitals in official listings of approved hospitals is made by footnote only.

The number of patients for which the individual intern is responsible has an important bearing on the value of the internship as an educational experience. If too few patients are available, adequate experience cannot be obtained. The assignment of an excessive number of patients to an intern, on the other hand, prevents the intern from studying each patient carefully and giving adequate attention to all patients assigned to him. In general, hospitals should appoint interns in such numbers that there will be an average for the hospital of 15 to 25 beds per intern. In determining the ratio which is educationally most desirable, consideration should be given to the amount of responsibility required of the intern for work in outpatient clinics, emergency services, laboratories or similar assignments.

Hospitals offering rotating internships should appoint at least four interns, since a well organized rotating internship covering the major divisions of medicine, surgery, obstetrics and pediatrics usually requires that at least one intern be assigned to each service.

## IV. The Hospital Staff

The staff, both visiting and intern, should be composed of physicians who are graduates of medical schools acceptable to the Council. The visiting staff should be composed of physicians having proper qualifications as to licensure (a) who are of unquestioned professional and moral integrity, (b) who are proficient in the fields of practice to which they devote themselves, (c) who give personal attention to the patients under their charge and (d) who pledge themselves, both individually and as a group, to provide ample instruction to the intern staff and to cooperate in their work.

## V. Clinical Records

1. Histories.—Adequate records must be maintained. The attending physician or surgeon should be directly responsible for the accuracy and completeness of clinical records concerning all patients under his care.

2. Endorsement of Records.—All case records should show by signature the names of the persons who have written them or their individual parts. Orders for treatment or for special diagnostic studies and progress notes should be signed by the person who writes them. Case histories and physical examinations completed by interns should give evidence of having been verified by the attending physician.

3. Filing and Indexing Records.—A competent medical record librarian should be in charge of the filing and indexing of records. To be of educational value, all case records should be readily available for special study or for reference work. When a patient is readmitted to the hospital, all previous records of his case should be obtainable without undue loss of time. Besides

the usual indexes of patients by name and number, there should be an index arranged according to diagnosis.

4. ANNUAL REPORT.—Statistics concerning the hospital's clinical work should be compiled monthly and should be available at all times to the medical staff. An annual report should be prepared. It should include analysis of these statistics which should be classified by departments, i. e., internal medicine, surgery, obstetrics, pediatrics, newborn, gynecology, ophthalmology, otolaryngology, etc. For each department at least the following data concerning private and ward services should be included:

(a) Number of patients admitted or discharged.
(b) Number of hospital days of care or average daily census.
(c) Death and necropsies.
(d) Surgical procedures.

## VI. Laboratories

1. EQUIPMENT.—There should be laboratories for clinical and tissue pathology in the hospital, under competent direction. These laboratories should be equipped and staffed to perform all procedures commonly used for diagnosis, management and therapy.

2. THE PATHOLOGIST.—The pathologist should hold the degree of doctor of medicine from an acceptable medical school and have qualifications in pathology acceptable to the Council. He should give to the hospital sufficient time to enable him (a) to supervise adequately the work done in the main pathologic laboratory of the hospital and in its branch laboratories, if any, (b) to examine or supervise the examination of all tissues removed in surgical operations and to furnish reports of the gross and microscopic findings, (c) to perform or supervise the performance of all necropsies and render a full report of the findings, (d) to assist in the teaching of interns, (e) to be available for consultation with members of the attending and intern staffs and (f) to attend staff meetings and conduct or participate in clinical-pathologic and departmental conferences.

3. NECROPSIES.—The hospital should provide proper facilities for the conduct of postmortem examinations. The necropsy rate has come to be recognized as an index of the scientific interest of the medical staff. Well performed postmortem examinations enable progressive physicians to improve their clinical ability. No hospital will be approved for intern training which does not maintain each year a record of necropsies performed in at least twenty per cent of its deaths exclusive of stillbirths and cases released to legal authorities.

4. RECORDS.—A copy of each examination performed in the laboratory of pathology should be retained in the department in addition to the copy filed on the patient's clinical record. All these examination reports should be indexed by name, number and diagnosis. Slides of specimens removed at operation or by necropsy should also be filed in the hospital laboratory.

## VII. Radiology

1. EQUIPMENT.—This department should be equipped with suitable safe apparatus. The rooms provided for fluoroscopy and for viewing roentgenograms should be large enough to accommodate both interns and attending physicians during the examination of patients or interpretation of films.

2. THE RADIOLOGIST.—The radiologist should hold the degree of doctor of medicine from an acceptable medical school and have qualifications in radiology acceptable to the Council. He should give to the hospital sufficient time to supervise adequately the technical work of the department, to perform or supervise fluoroscopic examinations, to interpret films, to consult with staff physicians, and to instruct the interns. He should also attend staff meetings and the meetings of his department.

3. RECORDS.—A copy of each examination report should be kept in the department in addition to the one filed in the patient's record. These reports and their original films should be filed and indexed by name, number and diagnosis.

## VIII. Medical Library

There should be a medical library, in the charge of a competent librarian, located where it is readily accessible at convenient hours to the interns and staff and containing a useful collection of recent editions of standard text and reference books, monographs and current files of an adequate number of recognized medical journals. Interns should be encouraged and stimulated to use the library in connection with their clinical work and may properly be asked to report on current medical opinion concerning any special case at the bedside or to review current literature or any selected topic more formally at staff conferences or at journal club meetings that may be organized for the purpose of stimulating an interest in reading.

## IX. Organization for Intern Training

1. The staff should be organized into departments or sections representing such specialties as internal medicine, surgery, pediatrics, obstetrics, pathology and radiology, so that the professional services of the hospital and the supervision of intern training may be carried out to best advantage. Overdepartmentalization should be avoided, although in large hospitals departmentalization may extend to include such other specialties as ophthalmology, otolaryngology, orthopedic surgery, urology, neurology, psychiatry, plastic surgery, neurological surgery, anesthesiology, physical medicine and contagious diseases. Each department or section should have a chairman or department head to serve for at least a year. He should be well qualified for this position by experience in his special field, should be responsible for the general conduct of the clinical work in his department and should help to formulate and execute the intern training plan to be carried out in this department. Frequent rotation of attending physicians in charge of the various services should be avoided. Assignments should be made so that the intern has ample opportunity to meet his attending physicians frequently for the conduct of systematic ward rounds or clinics and for the study and care of the patients for whom he is responsible. In order to assure the proper teaching relationships between interns and attending physicians, no intern should be called on to assist at any one time an unreasonable number of attending or visiting physicians.

2. CONFERENCES.—The staff, either as a whole or by departments, should conduct periodically and at least once a month staff or departmental meetings in which the work of the various clinical or laboratory services is thoroughly analyzed. Interns should be expected to attend and to take an active part in these meetings. Each month there should be one or more clinical-pathologic conferences. In addition, there should be such conferences as the current activities of the various departments may require. These conferences should be educational in nature and more than a perfunctory demonstration of interesting material. As has been suggested, the intern also should be encouraged to read medical literature in connection with his clinical work and may properly be asked to report formally on current medical opinion concerning any special case.

3. It is recommended that there be a period at the beginning of the internship devoted to orienting the intern in the administrative and professional organization of the hospital, and in the facilities available in such ancillary services as social service, dietetics and occupational therapy. This orientation may be given either in the period immediately before the intern reports for duty or during the first week or two of his service in the hospital.

4. INTERN COMMITTEE.—There should be a committee of the staff chosen from the chairmen of the several departments in the hospital, charged with the duty of organizing, supervising and evaluating the plan of intern instruction. The teaching obligations of individual staff members cannot be delegated to this committee but should be supervised by it.

5. DIRECTOR OF INTERN EDUCATION.—The appointment of a director of intern education on a full time or part time basis may be desirable in hospitals where the members of the staff are unable to devote the necessary time to the careful planning and supervision of the details of the internship program. The director should be a person who has had experience and training that qualify him to plan, with the assistance and cooperation of other members of the intern committee and the staff, a sound program of instruction for the interns. One of his important responsibilities should be to observe closely the operation of the program. He should be vested with sufficient authority to insure that his recommendations are carried out effectively. In cooperation with the chairmen of the several departments and the administration of the hospital he should undertake to integrate the various educational activities of the hospital.

The teaching obligations of individual staff members cannot be delegated to the director of intern education even though it is to be expected that he will take an active part in the teaching program. His function is to organize and supervise a program which will increase the effectiveness of the individual staff member's participation in the teaching program.

### X. Nature of the Intern's Duties

Each intern on duty in any clinical department should write or dictate the history, physical examination and his own diagnostic impression of all patients assigned to him. He should have laboratory work assigned to him of such nature as to give him familiarity with clinical laboratory methods and to develop competence in the use of all those which the average physician may be called on to perform. However, the intern should not be overburdened by an excessive amount of routine procedures of limited educational value. The nonoperative treatment of each patient should, in the main, be his responsibility under critical guidance by the attending physician.

The intern's record should be verified by a competent supervising physician, calling attention to errors in observation and adding supplementary notes containing any relevant data which the intern may have omitted. If the intern's record is acceptable, the supervising physician should countersign and thus approve it. The intern should enter frequent progress notes on the record describing the patient's clinical course and make certain that all treatments or special diagnostic studies are correctly recorded. When a patient is discharged, the intern should write a concluding note which summarizes the patient's course in the hospital, describes the patient's condition as he leaves the hospital and states the final diagnosis. This note should be verified by the attending physician.

### XI. Teaching Program

1. Bedside Teaching.—The most important phase of intern instruction consists in daily, regularly organized, well conducted teaching at the bedside. By this is meant systematic instruction of the intern by the attending physician with an ample discussion of the history, the clinical and laboratory findings, the diagnosis and the treatment of each patient. The social and psychologic aspects should receive proper emphasis. To conduct such teaching properly is the duty of the attending physician in direct charge of the patients assigned to the intern. It cannot be delegated to others, though it may be supplemented by supervision of the intern's work by the director of intern education, junior staff members or resident physicians. Assignments which have no educational value should be avoided as far as possible.

2. Internal Medicine.—This department should afford each intern an adequate amount of instruction and experience in general medicine including both the organic and functional aspects of disease and in such medical technics as are commonly employed in the practice of internal medicine.

3. Surgery.—Surgical training should be planned to emphasize diagnosis, preoperative and postoperative care of surgical cases, minor surgery and emergency care, rather than skill in operative technic. In the operating room the intern's role in surgery should be that of an assistant rather than that of an operator. The dressing of surgical wounds should be regarded as an important part of his experience, giving him a particularly valuable opportunity to observe carefully the immediate effects of surgical procedures and their treatment. He should obtain instruction and experience in administration of various types of anesthetics under the supervision of a trained anesthesiologist.

4. Obstetrics.—The intern is expected to assist at the delivery of all patients assigned to him and to deliver a minimum of 10 patients under direct supervision. Limited training in obstetrical anesthesia is desirable. Additional experience should be provided in prenatal and postnatal care and in the management of the complications of pregnancy and labor.

5. Pediatrics.—Training in pediatrics, in addition to affording the intern an adequate amount of instruction and experience in the medical, surgical and psychiatric aspects of the diseases of infancy and childhood, should include experience in the care of the newborn and the type of experience obtained in a well baby clinic.

6. Pathology.—The intern should receive experience in clinical laboratory work to increase his understanding of and ability to interpret routine laboratory procedures. He should be required to be familiar with the pathologic studies of surgical specimens and necropsy material which concern his own patients. Except in emergencies no assignment should be permitted to interfere with his attendance at the postmortem examination of any case which has been under his care. Whenever possible, he should assist in the preparation and presentation of the clinical-pathologic conference when cases assigned to him are being reviewed. Interns assigned to the department of pathology should, when possible, assist at necropsies, receiving instruction in technic and in pathologic interpretation.

7. Outpatient Department.—It is desirable that each intern should have satisfactorily supervised experience in outpatient work under circumstances comparable to the office practice of medicine. Whenever possible, outpatient assignments should be closely correlated with corresponding services in the hospital, thus encouraging careful follow-up work and observation of patients over a long period of time.

### XII. Miscellaneous

1. Record of Interns' Work.—It is recommended that the hospital keep an adequate record of the interns' activities during his period of service. Such information is helpful to the hospital in evaluating the operation of the internship program and may be requested by state licensing boards, medical schools and other agencies.

2. Rules Regarding Interns.—The hospital should supply each intern with written or printed rules defining his duties and privileges.

3. Interns' Living Quarters.—The hospital should provide for the intern comfortable living quarters, healthful food and suitable recreational opportunities.

4. Interns' Health.—The hospital should be responsible for the interns' health, at least to the extent of providing at the beginning of each intern's service a careful physical examination and laboratory studies, including a roentgenogram of the chest and immunization against communicable diseases. There should be at all times a readily accessible consultation service for interns with some member of the staff definitely assigned to this work. Periodic chest x-rays are desirable at six month intervals during the intern's term of service.

5. Relationship between Hospital and Intern.—To avoid misunderstanding, it is desirable that each intern at the time of his appointment should enter into a formal agreement with the hospital defining mutual obligations. Such agreement should be honorably fulfilled by both parties. A breach of the agreement by either a hospital or an intern is not condoned by the Council. Whenever complaint is made of a breach of agreement it is the policy of the Council to ask each of the parties to submit an explanatory statement. Such statements become a part of the physician's and the hospital's record.

### XIII. Admission to the Approved List

1. Application For Approval.—Registration of a hospital by the American Medical Association is a prerequisite to the consideration of a hospital for approval for intern training. Hospitals that desire to be accredited for intern training should apply to the Council on Medical Education and Hospitals of the American Medical Association, 535 North Dearborn Street, Chicago 10. For this purpose forms in duplicate will be supplied on request. They should be filled out with care by the superintendent or by some member of the staff who is familiar with the hospital's intern program, and one copy should be returned to the Council.

2. Approval for the training of interns is granted for the current year only and is subject to renewal annually on the basis of current information concerning the educational program. Approval may be withdrawn at any time that a hospital ceases to comply with one or more of the requirements set forth in the Essentials of a Registered Hospital or the Essentials of an Approved Internship. Approval may also be withdrawn from hospitals in which the intern program has not been in operation for a period of two consecutive years.

# APPROVED MEDICAL SCHOOLS IN THE UNITED STATES

## ALABAMA

### Birmingham

**Medical College of Alabama.**—Established in 1943 as a division of the University of Alabama. Located in Birmingham in 1944. In 1945 assumed title to Jefferson Hospital and Hillman Hospital, Birmingham. The Medical College of Alabama cares for all indigent patients of the county and city, maintenance of which is paid to the university on a per diem basis by the county. In 1943 the appropriation included $1,000,000 for the building of a new medical school which will be erected as early as possible, and temporary quarters are now in the Jefferson-Hillman Hospital. First instruction in the Medical College of Alabama started June 4, 1945, with a junior class and this class was graduated in October, 1946. On October 8, 1945, the School of the Basic Medical Sciences on the University Campus, established in 1920, and its faculty, were absorbed into the new Medical College of Alabama. The medical college is coeducational. Minimum entrance requirements are three years of college work. Tuition is as follows: for legal residents of Alabama $400 per academic year plus incidental fees of $20. Nonresidents of the state are charged an additional $225 each session. The registration for the 1948-1949 session was 186; graduates 31. The last session began Sept. 13, 1948, and ended June 7, 1949. The next session for the first and second year classes will start Sept. 16, 1949, and for the third and fourth year classes the session will begin Sept. 6, 1949. All classes will end June 3, 1950. The Dean is Roy R. Kracke, M.D.

## ARKANSAS

### Little Rock

**University of Arkansas School of Medicine,** 1209 McAlmont Street.—Organized in 1879 as the Medical Department of Arkansas Industrial University. Present title in 1899. In 1911 the College of Physicians and Surgeons united with it and it became an integral part of the University of Arkansas. The first class was graduated in 1880. Clinical teaching was suspended in 1918 but resumed in 1923. Coeducational since organization. The curriculum covers four sessions of nine months each. Entrance requirements are three years of collegiate work. The B.S. degree is conferred at the end of the second year. The fees for the four years for residents of Arkansas are $380 a year; nonresidents are charged $505 a year. The registration for the 1948-1949 session was 303; graduates 54. The last session began September 27, 1948, and ended June 17, 1949. The next session will begin September 26, 1949, and will end June 16, 1950. The Vice President is Henry Clay Chenault, M.D.; the Acting Dean is William C. Langston, M.D.

## CALIFORNIA

### Berkeley-San Francisco

**University of California Medical School,** University Campus, Berkeley; Medical Center, San Francisco 22.—Organized in 1864 as the Toland Medical College. The first class graduated in 1864. In 1873 it became the Medical Department of the University of California. In 1909, by legislative enactment, the College of Medicine of the University of Southern California, at Los Angeles, became a clinical department but was changed to a graduate school in 1914. In 1915 the Hahnemann Medical College of the Pacific was merged and elective chairs in homeopathic materia medica and therapeutics were provided. Coeducational since organization. Three years of collegiate work are required for admission. The work of the first year is given at Berkeley and that of the last three years at San Francisco. The medical course consists of four academic years, each containing two semesters of sixteen weeks each. The fees are $320 per academic year. Nonresidents are charged $250 additional each year. The registration for the 1948-1949 session was 283; graduates 65. The last session began Sept. 13, 1948 and ended June 16, 1949. The next class will begin Sept. 15, 1949 and will end June 15, 1950. The Dean is Francis Scott Smyth, M.D., San Francisco.

### Loma Linda-Los Angeles

**College of Medical Evangelists,** Loma Linda; Boyle and Michigan Avenues, Los Angeles 33.—Organized in 1909. The first class graduated in 1914. The laboratory departments are at Loma Linda; the clinical departments at Los Angeles. Coeducational since organization. Three years of collegiate work are required for admission. The freshman, sophomore and junior years consist of nine month academic sessions and the senior year will have in addition to the nine month session a seven weeks' clinical clerkship during the summer between the junior and senior years. A twelve month internship in an approved hospital is required. The yearly tuitions including fees are respectively, $737.00, $725.50, $741.25 and $748.75. The registration for 1948-1949 was 327; graduates 85. The last session for freshman, sophomore and junior students began on Sept. 12, 1948 and ended June 16, June 23 and June 10, 1949, respectively. The senior session began June 13, 1948 and was completed June 12, 1949. The next session for freshman and sophomore students will begin Sept. 4, 1949, junior students Sept. 11, 1949 and senior students began June 12, 1949 and will end June 9, 1950 for the first three classes and June 11, 1950 for seniors. The President is George T. Harding, M.D., Los Angeles. The deans are Harold Shryock, M.D., Loma Linda, and William F. Norwood, Ph.D., Los Angeles.

### Los Angeles

**University of Southern California School of Medicine,** 3518 University Avenue, Zone 7.—Organized in 1895 as the University of Southern California College of Medicine. First class graduated in 1899. In 1908 it became the Los Angeles Medical Department of the University of California. In 1909 the College of Physicians and Surgeons, established in 1904, became the Medical Department of the University of Southern California. Its activities were suspended in 1920; reorganized in May 1928, under present title. Entrance requirements are approximately 90 semester hours. An internship is required for graduation. Coeducational since organization. Annual fees amount to approximately $600. The registration for 1948-1949 was 262; graduates 60. The last session began September 13, 1948 and ended June 11, 1949. The next session will begin Sept. 12, 1949 and will end June 10, 1950. The Dean is Burrell O. Raulston, M.D.

### Stanford University-San Francisco

**Stanford University School of Medicine,** University Campus, Stanford University; 2398 Sacramento Street, San Francisco. The main buildings are in San Francisco. The laboratories of anatomy, bacteriology and experimental pathology, chemistry and physiology are located on the campus at Stanford University, which is thirty miles southeast of San Francisco adjoining the city of Palo Alto. The post office is Stanford University. Organized in 1908, when by agreement the interests of Cooper Medical College were taken over. The first class graduated in 1913. Coeducational since organization. Three years of collegiate work are required for admission. The quarter plan is in operation. An internship is a requirement for graduation. The average fee for each of the four years is $699. The registration for 1948-1949 was 242; graduates 59. The last session for all classes began Sept. 27, 1948 and ended June 15, 1949. The next session will begin Sept. 26, 1949 and will end June 14, 1950. The Dean is Loren R. Chandler, M.D.

## COLORADO

### Denver

**University of Colorado School of Medicine,** 4200 East Ninth Avenue.—Organized in 1883. Classes were graduated in 1885 and in all subsequent years except 1898 and 1899. Denver and Gross College of Medicine was merged Jan. 1, 1911. Coeducational since organization. The entrance requirements are ninety semester hours of collegiate work. The fees average $525 per academic year. Nonresidents are charged $300 additional each year. The registration for 1948-1949 was 251; graduates 58. The last session began Sept. 27, 1948 and ended June 13, 1949. The next session will begin Sept. 26, 1949 and will end June 12, 1950. The Dean is Robert C. Lewis, Ph.D.

## CONNECTICUT

### New Haven

**Yale University School of Medicine,** 333 Cedar Street.—Chartered in 1810 as the Medical Institution of Yale College. Organized in 1812; instruction began in 1813; first class graduated in 1814. A new charter in 1879 changed the name to the Medical Department of Yale College. In 1884, the Connecticut Medical Society surrendered such authority as had been granted by the first charter. In 1887, Yale College became Yale University. Coeducational since 1916. The requirements for admission are three years collegiate work. The fees average $750 per academic year. The registration for 1948-1949 was 231; graduates 47. The last session began Sept. 22, 1948 and ended June 11, 1949. The next session will commence Sept. 21, 1949 and will end June 6, 1950. The Dean is C. N. Hugh Long, M.D.

## DISTRICT OF COLUMBIA

### Washington

**Georgetown University School of Medicine,** 3900 Reservoir Road, N. W., Zone 7.—Organized in 1851. First class graduated in 1852. The degree of Bachelor of Arts or Bachelor of Science or its equivalent from an approved college of arts and sciences is required for admission of nonveterans, but veterans may be admitted with a minimum of 90 semester hours of credit. The fees average $835.00 per academic year. Registration for 1948-1949 was 389; graduates 73. The last session for freshmen and sophomores began September 20, 1948 and ended May 28, 1949; the junior class began August 30, 1948 and ended May 21, 1949 and the senior class began June 1, 1948 and ended June 13, 1949. The next session for freshmen will begin September 12, 1949 and will end May 27, 1950; the sophomores will begin September 19, 1949 and will end May 27, 1950; the juniors will be in session from August 29, 1949 to May 20, 1950; the senior session began June 1, 1949 and will end June 12, 1950. The Dean is Rev. Paul A. McNally, S.J., Ph.D.

**George Washington University School of Medicine,** 1335 H Street, N. W.—Organized in 1825 as the Medical Department of Columbian College. Also authorized to use the name "National Medical College." Classes were graduated in 1826 and in all subsequent years except in 1834-1838 and 1861-1863 inclusive. The original title was changed to Medical Department of Columbian University in 1873. In 1903 it

absorbed the National University Medical Department. In 1904 by an Act of Congress the title of George Washington University was granted to the institution. Coeducational since 1884. Ninety semester hours of college work are required for admission. The fees average $650 per academic year. The registration for 1948-1949 was 320; graduates 69. The last session began Sept. 20, 1948 and ended June 1, 1949. The next session will begin Sept. 19, 1949 and will end May 31, 1950. The Dean is Walter A. Bloedorn, M.D.

**Howard University College of Medicine,** Fifth and W Streets, N. W., Zone 1.—Chartered in 1867. Organized in 1869. The first class was graduated in 1871. Coeducational since organization. Negro students compose a majority of those in attendance. The minimum requirements are two years of collegiate work, but practically the bachelor's degree. The course covers four years of thirty-three weeks each. The fees are, respectively: $397.50; $392.50; $382.50 and $402.50. The registration for 1948-1949 was 275; graduates 66. The last session began Sept. 27, 1948 and ended June 3, 1949. The next session will begin October 3, 1949 and will end June 9, 1950. The Dean is Joseph L. Johnson, M.D.

## GEORGIA

### Atlanta

**Emory University School of Medicine.**—Organized in 1854 as the Atlanta Medical College. Classes graduated 1855 to 1861, when it suspended. Reorganized in 1865. A class graduated in 1865 and each subsequent year except 1874. In 1898 it merged with the Southern Medical College (organized in 1878), taking the name of Atlanta College of Physicians and Surgeons. In 1913 it merged with Atlanta School of Medicine (organized in 1905), reassuming the name of Atlanta Medical College. Became the School of Medicine of Emory University in 1915. Three years of collegiate work are required for admission. The course of study is four academic years: 36 weeks each in the first and second years; 40 weeks each in the third and fourth years. The fees for each of the four academic years are $600. The registration for 1948-1949 was 233; graduates 39. The last session for freshmen and sophomores began Sept. 23 and 27, 1948 and ended June 3, 1949; the last session for juniors began Sept. 7, 1948 and ended June 3, 1949; the last session for seniors began August 2, 1948 and ended June 3, 1949. The next session for freshmen and sophomores will begin Sept. 1 and 6, 1949 and will end June 2, 1950. The session for junior and senior classes began Aug. 1, 1949 and will end on June 2, 1950 The Dean is R. Hugh Wood, M.D.

### Augusta

**University of Georgia School of Medicine,** University Place.—Organized in 1828 as the Medical Academy of Georgia, the name being changed to the Medical College of Georgia in 1929. After 1873 it was known as the Medical Department of the University of Georgia. On July 1, 1933, the name was changed to the University of Georgia School of Medicine. Property transferred to the University in 1911. Classes were graduated in 1833 and all subsequent years except 1862 and 1863. Coeducation was begun in 1920. Three years of collegiate work are required for admission. Fees for 1949-1950, $300 per academic year for residents of Georgia, nonresidents $600. Only bona fide residents of Georgia admitted (with exception of A. S. T. and V-12 Program students during World War II). The registration for the 1948-1949 session was 202; graduates, 68. The next session will begin September 15, 1949 and will end June 5, 1950. The Dean is G. Lombard Kelly, M.D.

## ILLINOIS

### Chicago

**Chicago Medical School,** 710 South Wolcott Ave.—Founded in 1912 as the Chicago Hospital College of Medicine. In 1919 the name of the institution was changed to the Chicago Medical School. The school moved from its former location to its present site in the Medical Center in 1930. The Chicago Medical School is a nonsectarian, coeducational institution. It is chartered in the State of Illinois as a nonprofit institution. Three years of collegiate work are required for admission. The yearly tuition fees are, respectively, $655, $860, $825 and $620. The registration for 1948-1949 was 235. The last session for freshmen began Oct. 4, 1948 and for sophomores July 6, 1948 and ended June 18, 1949; the junior and senior session began Oct. 4, 1948 and ended for seniors June 25, 1949. The junior class will end Sept. 24, 1949. The next session for freshmen, juniors and seniors will begin Oct. 3, 1949 and will end June 17, June 17 and June 24, 1950. The sophomore class began July 5, 1949 and will end June 17, 1950. The Dean is John J. Sheinin, M.D.

**Northwestern University Medical School,** 303 East Chicago Avenue.—Organized in 1859 as the Medical Department of Lind University. First class graduated in 1860. In 1864 it became independent as the Chicago Medical College. It united with Northwestern University in 1869 but retained the name of Chicago Medical College until 1891, when the present title was taken. Became an integral part of Northwestern University in 1905. Coeducational since 1926. The requirement for admission is 85 semester hours of collegiate work. The B.S. in medicine degree may be conferred before the end of the senior year. A hospital internship is required for graduation. The total fees are $600 each year. The registration for 1948-1949 was 525; graduates 130. The last sesion began Sept. 24, 1948 and ended June 13, 1949. The next session will begin Sept. 23, 1949 and will end June 16, 1950. The Dean is Richard H. Young, M.D.

**Stritch School of Medicine of Loyola University,** 706 South Wolcott Avenue.—Organized in 1915 by acquisition of Bennett Medical College, which had been organized in 1869. Facilities enlarged by the acquisition of Chicago College of Medicine and Surgery. Faculties in basic sciences put on full time basis and assumed name of Loyola University School of Medicine in 1917. Operated as an organic part of Loyola University. Name officially changed to Stritch School of Medicine of Loyola University on April 15, 1948. Coeducational since organization. Ninety semester hours of collegiate work are required for admission. The fees are $675 a year. The registration for 1948-1949 was 295; graduates 53. The last session for freshmen, sophomores and juniors began Sept. 27, 1948 and ended June 25, 1949; the session for seniors began Sept. 13, 1948 and ended June 4, 1949. The next session will begin Sept. 26, 1949 and will end June 17, 1950 for the first three classes and June 10, 1950 for seniors. The Dean is James J. Smith, M.D.

**University of Chicago, The School of Medicine,** Fifty-Eighth Street and Ellis Avenue.—Organized in 1924, as a part of the Ogden Graduate School of Science of the University of Chicago. In 1932, when the University of Chicago reorganized its departments, the medical departments were included in the Division of Biological Sciences. The work of the first two years in the medical courses has been given on the University Quadrangles since 1899; but the last two years were offered only at Rush Medical College, which was affiliated with the university until 1927 when actual work in the clinical departments on the campus began. After that time candidates for the degree of Doctor of Medicine could take the work of the first two years on the campus and the work of the third and fourth years either on the campus or at the Rush Medical College. In June 1940 Rush Medical College became affiliated with the University of Illinois College of Medicine. All undergraduate instruction is now given only on the campus of the University of Chicago. An especial function of the school is to train people for making contributions to the advancement of medical science. The requirements for admission are 90 semester hours of collegiate work. The curriculum covers twelve quarters of work. Seventy-two students are admitted to the first year class each year. The tuition fee averages $720. The registration for 1948-1949 was 246; graduates, 55. Quarters begin in March, June, September and December of each year. The Dean of the Division of the Biological Sciences is Lowell T. Coggeshall, M.D. All correspondence relating to general policies should be addressed to A. C. Bachmeyer, M.D., Associate Dean of the Division of Biological Sciences, and that pertaining to student affairs, including admission, to F. J. Mullin, Ph.D., Dean of Students.

**University of Illinois College of Medicine,** 1853 West Polk Street, Zone 12.—Organized in 1882 as the College of Physicians and Surgeons. The first class graduated in 1883. It became the Medical Department of the University of Illinois by affiliation in 1897. Relationship with the university was canceled in June 1912, and was restored in March 1913, when the present title was assumed. The staff of the Rush Medical College was incorporated in the University of Illinois College of Medicine in 1942 and at the same time Presbyterian Hospital, Chicago, became a teaching unit of the university. Coeducational since 1898. Three years of collegiate work are required for admission. The B.S. in medicine degree may be conferred at the end of the second year. The fees for residents of Illinois average $292 per academic year; nonresidents pay an additional fee of $150. The registration for the 1948-1949 session was 653; graduates, 158. The last session began Sept. 27, 1948 and ended June 18, 1949. The next session will begin Sept. 27, 1949 and will end June 17, 1950. The Dean is John B. Youmans, M.D.

## INDIANA

### Bloomington-Indianapolis

**Indiana University School of Medicine,** Bloomington; 1040 West Michigan Street, Indianapolis.—Organized in 1903 but did not give all the work of the first two years of the medical course until 1905. In 1907 by union with the State College of Physicians and Surgeons, the complete course in medicine was offered. In 1908 the Indiana Medical College, which was formed in 1905 by the merger of the Medical College of Indiana (organized in 1878), the Central College of Physicians and Surgeons (organized in 1879), and the Fort Wayne College of Medicine (organized in 1879) merged into it. The first class was graduated in 1908. Coeducational since organization. The B.S. degree in anatomy and physiology is conferred. Three years of college work are required for admission. The work of the first two semesters is given at Bloomington; the remainder of the work at Indianapolis. Regular fee for two semesters of work is $221 for residents of Indiana and $426 for nonresidents. The registration for the 1948-1949 session was 438; graduates 81. The last session began Sept. 20, 1948 and ended June 12, 1949. The next session will begin Sept. 19, 1949 and will end June 11, 1950. The Dean is John D. Van Nuys, M.D., Indianapolis.

## IOWA

### Iowa City

**State University of Iowa College of Medicine,** University Campus.—Organized in 1869. First session began in 1870. First class graduated in 1871. Absorbed Drake University College of Medicine in 1913. Coeducational since 1870. Three years of collegiate work are required for admission. The B.A. degree in the combined course of liberal arts and medicine is conferred. The tuition fee is $230 each year for residents of Iowa and $490 for nonresidents. The registration for 1948-1949 was 299; graduates 58. The last session began Sept. 23,

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1948 and ended June 10, 1949. The next session will begin Sept. 22, 1949 and will end on June 10, 1950. The Chairman of the Executive Committee is Robert T. Tidrick, M.D.

## KANSAS

### Lawrence-Kansas City

**University of Kansas School of Medicine,** Lawrence; 39th Street and Rainbow Boulevard, Kansas City.—Organized in 1880. It offered only the first two years of the medical course until 1905, when it merged with the Kansas City (Mo.) Medical College, founded in 1869, the College of Physicians and Surgeons, founded in 1894, and the Medico-Chirurgical College, founded in 1897. Absorbed Kansas Medical College of Topeka in 1913. The first class graduated in 1906. The clinical courses are given in Kansas City. At present the first year and one half of the medical course is given on the University campus at Lawrence, Kansas. The class is transferred to the Kansas City, Kansas, campus in the middle of the second year, where the balance of the course is given. Coeducational since 1880. The requirement for admission is three years of collegiate work. The fees are $325 per year; the nonresident fees are $625 per year. The registration for 1948-1949 was 334; graduates 82. The last session began June 14, 1948 and ended June 2, 1949. The 1949 freshman class began June 13 and the sophomore class will begin on September 20 and both will end June 4, 1950. The junior and senior classes began June 6, 1949 and will end May 27, 1950. Three-fourths of each junior and senior class is in school all the time while one-fourth is on vacation each quarter. The Dean is Franklin D. Murphy, M.D., Kansas City.

## KENTUCKY

### Louisville

**University of Louisville School of Medicine,** 101 West Chestnut Street, Zone 2.—Organized in 1837 as Louisville Medical Institute. The first class graduated in 1838, and a class graduated each subsequent year except 1863. In 1846 the name was changed to University of Louisville Medical Department. In 1907 it absorbed the Kentucky University Medical Department; in 1908, the Louisville Medical College, the Hospital College of Medicine and the Kentucky School of Medicine. In 1922 it changed its name to the University of Louisville School of Medicine. Coeducational since organization. Two years of collegiate work are the minimum requirements for admission. Preference is given applicants with a degree or three college years leading to a degree. Fees are $550 for residents of Louisville and Jefferson County and $650 for nonresidents, per school year. The registration for 1948-1949 was 362; graduates 82. The school year is divided into two semesters and students are accepted for matriculation only at the beginning of the first semester. The last session began Sept. 22, 1948 and ended June 11, 1949. The next session begins on Sept. 14, 1949, and will end on June 10, 1950. The Dean is J. Murray Kinsman, M.D.

## LOUISIANA

### New Orleans

**Louisiana State University School of Medicine,** 1542 Tulane Avenue, Zone 12.—Organized January 1931 as Louisiana State University Medical Center. Present title in 1939. Coeducational. First session began in October 1931 with students of first and third years. Course covers four sessions of not less than 36 weeks each. A minimum of three years' collegiate work is required for admission. Total fees, $120 each year for residents of Louisiana; additional tuition of $400 each year for nonresidents. The registration for 1948-1949 was 322; graduates 58. The last session began September 7, 1948 and ended June 4, 1949. The next session will begin September 6, 1949 and end June 3, 1950. The Dean is William W. Frye, M.D.

**Tulane University of Louisiana School of Medicine,** 1430 Tulane Avenue. —Organized in 1834 as the Medical College of Louisiana. Classes were graduated in 1835 and in all subsequent years except 1863-1865, inclusive. It became the Medical Department of the Tulane University of Louisiana in 1884. Present title in 1913. Coeducational since 1915. A minimum of three years of collegiate work is required for admission. Total fees average $650 per academic year. The registration for the 1948-1949 session was 499; graduates 114. The last session began on Sept. 1, 1948 and ended on June 1, 1949. The next session will begin Aug. 31, 1949 and will end June 11, 1950. The Dean is Maxwell E. Lapham, M.D.

## MARYLAND

### Baltimore

**Johns Hopkins University School of Medicine,** 710 North Washington Street.—The nucleus of a Medical Faculty was constituted in 1883. Systematic postgraduate instruction in pathology and bacteriology was begun in 1886. School was fully organized and opened in 1893. The first class graduated in 1897. Coeducational since organization. The requirement for admission is a college degree. The course extends over four years of eight and one-half months each. The fees averaged $828 per academic year. The registration for 1948-1949 was 293; graduates 73. The last session began on Oct. 4, 1948 and ended June 14, 1949. The next session will begin on Oct. 3, 1949 and will end June 13, 1950. The Dean is Alan M. Chesney, M.D.

**University of Maryland School of Medicine and College of Physicians and Surgeons,** Lombard and Greene Streets, Zone 1.—Organized in 1807 as the College of Medicine of Maryland. The first class graduated in 1810. In 1812 it became the University of Maryland School of Medicine. Baltimore Medical College was merged with it in 1913. In 1915 the College of Physicians and Surgeons of Baltimore was merged and the present name assumed. Coeducational since 1918. Three years of college work are required for admission. The tuition fees average $513 for residents of the state; for nonresidents $150 additional. The registration for 1948-1949 was 337; graduates 69. The last session began Sept. 16, 1948 and ended June 4, 1949. The next session will begin Sept. 22, 1949 and will end June 10, 1950. The Dean is H. Boyd Wylie, M.D.

## MASSACHUSETTS

### Boston

**Boston University School of Medicine,** 80 East Concord Street, Zone 18.—Organized in 1873 as a homeopathic institution. In 1874 the New England Female Medical College, founded in 1848, was merged into it. The first class was graduated in 1874. Became nonsectarian in 1918. Coeducational since organization. Applicants are required to present a minimum of three years of premedical work. Total fees average $800 per year. The registration for 1948-1949 was 237; graduates 52. The last session for freshmen, sophomores and juniors began September 13, 1948 and ended May 28, 1949. The last senior class began June 14, 1948 and ended June 6, 1949. The present senior class began June 13, 1949 and will end June 5, 1950. All other classes will be enrolled September 12, 1949, and the session will end May 27, 1950. The Dean is James M. Faulkner, M.D.

**Harvard Medical School,** 25 Shattuck Street, Zone 15.—Organized in 1782. The first class graduated in 1788. Two years of collegiate work are required for admission. The fees average $850. The registration for 1948-1949 was 511; graduates 141. The last session began Sept. 27, 1948 and ended on June 23, 1949. The next session will begin Sept. 26, 1949 and will end June 22, 1950. The Dean is George Packer Berry, M.D.

**Tufts College Medical School,** 136 Harrison Avenue, Zone 11.—Organized in 1893 as the Medical Department of Tufts College. The first class graduated in 1894. Coeducational since 1894. A bachelor's degree is required for admission. Enrolment is generally limited to residents of the New England states. The course covers four years. Total fees for each of the four years are, respectively, $810, $805, $805, $815. The registration for 1948-1949 was 390; graduates 78. The last session for freshmen, sophomores and juniors began Sept. 22, 1948; for seniors June 14, 1948, and all classes ended June 19, 1949. The present session began for the seniors on June 13, 1949 and for the other classes will begin Sept. 21, 1949 and will end June 11, 1950. The Dean is Dwight O'Hara, M.D.

## MICHIGAN

### Ann Arbor

**University of Michigan Medical School.**—Organized in 1850 as the University of Michigan Department of Medicine and Surgery. The first class graduated in 1851. Present title assumed in 1915. Coeducational since 1870. The entrance requirements are ninety semester hours. The fees average $280 per academic year; for nonresidents $500 a year. The registration for 1948-1949 was 469; graduates 107. The last session began Sept. 20, 1948 and ended June 11, 1949. The next session will begin Sept. 26, 1949 and will end June 17, 1950. The Dean is A. C. Furstenberg, M.D.

### Detroit

**Wayne University College of Medicine,** 1512 St. Antoine Street, Zone 26. —Organized as the Detroit College of Medicine in 1885 by consolidation of the Detroit Medical College (organized in 1868) and the Michigan College of Medicine (organized in 1879). Reorganized with the title of Detroit College of Medicine and Surgery in 1913. The first class graduated in 1869. In 1918 it became a municipal institution under the control of the Detroit Board of Education. In 1934 the name was changed by action of the Detroit Board of Education to Wayne University College of Medicine, as a part of the program of consolidation of the Detroit city colleges into a university system. Coeducational since 1917. Entrance requirement is 90 semester hours from an accredited college or university. Until further notice, enrolment is limited to residents of the State of Michigan. The fees average $525 for the school year. The registration for 1948-1949 was 227; graduates 37. The last session began Sept. 20, 1948 and ended June 18, 1949. The next session will begin Sept. 12, 1949 and will end June 15, 1950. The Acting Dean is Gordon H. Scott, Ph.D.

## MINNESOTA

### Minneapolis

**University of Minnesota Medical School,** Zone 14.—Organized in 1883 as the University of Minnesota College of Medicine and Surgery and reorganized in 1888 by absorption of the St. Paul Medical College and Minnesota Hospital College. The first class graduated in 1889. In 1908 the Minneapolis College of Physicians and Surgeons, organized in 1883, was merged. In 1909 the Homeopathic College of Medicine and Surgery was merged. Present title in 1913. Coeducational since organization. The entrance requirements are three years of university work. Students are required to meet the requirements for a degree of B.S. or B.A. before receiving the degree of Bachelor of Medicine (M.B.), which is granted at the end of the course. The M.D. degree is conferred after a year of

intern work, of advanced laboratory work or of public health work has been completed. Total fees are $307.95 per academic year for residents and $526.95 for nonresidents. The registration for 1948-1949 was 426; graduates, 124. The last session began Sept. 27, 1948 and ended June 11, 1949. The next session will begin Sept. 26, 1949 and will end July 21, 1950. The school year of the first three years consists of fall and winter quarters of approximately 11 weeks and a spring quarter of approximately 16 weeks; in the senior year the spring quarter is 11 weeks in length and graduation is in June. The Dean of Medical Sciences is Harold S. Diehl, M.D.

## MISSOURI

### St. Louis

**St. Louis University School of Medicine,** 1402 South Grand Boulevard, Zone 4.—Organized in 1901 as the Marion-Sims-Beaumont Medical College by union of Marion-Sims Medical College, organized in 1890, and Beaumont Hospital Medical College, organized in 1886. First class graduated in 1902. It became the Medical School of St. Louis University in 1903. The completion of three years of college study is the minimum admission requirement, but students presenting meritorious credits in excess of the minimum are accepted by preference. The fees average $710. The registration for 1948-1949 was 431; graduates, 90. The last session began Sept. 14, 1948 and ended June 1, 1949. The next session will begin Sept. 20, 1949 and will end June 1, 1950. The Dean is Melvin A. Casberg, M.D.

**Washington University School of Medicine,** Kingshighway and Euclid Avenue, Zone 10.—Organized in 1842 as the Medical Department of St. Louis University. The first class graduated in 1843. In 1855 it was chartered as an independent institution under the name of St. Louis Medical College. In 1891 it became the Medical Department of Washington University. In 1899 it absorbed the Missouri Medical College. Coeducational since 1918. Three years of college work is required for admission. The B.S. degree in medicine is conferred at the end of the third or fourth year. The fees average $700. In 1950 the fees will be increased to $800. The registration for 1948-1949 was 351; graduates 96. The last session began on Sept. 13, 1948 and ended June 7, 1949. The next session will begin on Sept. 12, 1949 and will end on June 6, 1950. The Dean is Robert A. Moore, M.D.

## NEBRASKA

### Omaha

**Creighton University School of Medicine,** 302 North Fourteenth Street, Zone 2.—Organized in 1892 as the John A. Creighton Medical College. The first class graduated in 1893. Present title in 1921. Coeducational since organization. Ninety semester hours of collegiate work are required for admission. The tuition fees average $700 per academic year. The registration for 1948-1949 was 248; graduates 39. The last session began Sept. 24, 1948 and ended June 2, 1949. The next session will begin Sept. 22, 1949 and will end June 1, 1950. The Dean is Percy J. Carroll, M.D.

**University of Nebraska College of Medicine,** Forty-Second Street and Dewey Avenue, Zone 5.—Organized in 1881 as the Omaha Medical College. The first class graduated in 1882. It became the Medical Department of Omaha University in 1891. The University of Nebraska College of Medicine was established in Lincoln in 1883, and in 1902 the Omaha Medical College became a part of the University of Nebraska and has continued with the present title College of Medicine, University of Nebraska. The instruction of the first two years was given at Lincoln and of the last two years at Omaha until 1913, when the work of all four years was transferred to Omaha. Coeducational since 1882. Three years of college work are required for admission. The B.S. degree in medicine is conferred at the end of the second year. The fees average $450 per academic year; nonresidents are charged an additional $150. The registration for 1948-1949 was 302; graduates 58. The last session for seniors began Sept. 13, 1948, and ended May 28, 1949. The last session for freshmen, and sophomores and juniors began Sept. 13, 1948 and ended June 4, 1949. The next session will begin Sept. 12, 1949 and will end June 3, 1949. The Dean is Harold C. Lueth, M.D.

## NEW YORK

### Albany

**Albany Medical College,** 47 New Scotland Avenue.—Organized in 1838. The first class graduated in 1839. It became the Medical Department of Union University in 1873. In 1915 Union University assumed educational control. Coeducational since 1915. The requirement for admission is three years of college work. The fees average $725 per academic year. The registration for 1948-1949 was 186; graduates 41. The last session began for the freshmen and sophomores on Sept. 27, 1948 and ended on June 15, 1949 for the freshmen and on June 11, 1949 for the sophomores; the last session for the juniors began on Sept. 13, 1948 and ended on May 21, 1949, for the seniors June 1, 1948 to May 31, 1949. The present senior class began on June 1, 1949 and will end May 31, 1950. The next session for other classes will begin on Sept. 26, 1949 and will end June 15, 1950. The Dean is R. S. Cunningham, M.D.

### Brooklyn

**Long Island College of Medicine,** 350 Henry Street, Zone 2.—Chartered in 1950, was originally organized in 1858 as the Long Island College Hospital. From the collegiate department the first class graduated in 1860 and the last class in 1930. The first class of the Long Island College of Medicine was graduated in 1931. It is coeducational. Three years of collegiate work, including specified courses, are required for admission. The fees are $715 per academic year. The registration for 1948-1949 was 416; graduates, 101. The last session for seniors began Sept. 13, 1948 and ended June 4, 1949. The last session for freshmen, sophomores and juniors began on Sept. 20, 1948 and ended on June 11, 1949. The next session begins for freshmen, sophomores and juniors on Sept. 19, 1949 and ends June 10, 1950, for seniors the next session will begin Sept. 12, 1949 and will end June 3, 1950. The President is Jean A. Curran, M.D. The Dean is Duncan W. Clark, M.D.

### Buffalo

**University of Buffalo School of Medicine,** 24 High Street.—Organized in 1846. The first class graduated in 1847. It absorbed the Medical Department of Niagara University in 1898. Coeducational since organization. The minimum requirement for admission is three years of collegiate work including certain prescribed science subjects. The fees average $628. The registration for 1948-1949 was 259; graduates 49. The last session began on Sept. 20, 1948 and ended June 18, 1949. The next session will begin Sept. 19, 1949 and will end on June 17, 1950 for freshmen and sophomores and on June 3, 1950 for juniors and seniors. The Dean is Stockton Kimball, M.D.

### New York

**Columbia University College of Physicians and Surgeons,** 630 West One Hundred and Sixty-Eighth Street.—The medical faculty of Columbia College, then known as King's College, was organized in 1767. Instruction was interrupted by the War of the Revolution. The faculty was reestablished in 1792 and merged in 1814 with the College of Physicians and Surgeons, which had received an independent charter in 1807. In 1860 the College of Physicians and Surgeons became the Medical Department of Columbia College. This merger became permanent by legislative enactment in 1891. Columbia College became Columbia University in 1896. The medical school has been coeducational since 1917. Three years of collegiate work are required for admission. Fees average $800 per academic year. The registration for 1948-1949 was 436; graduates 108. The last session began on June 7, 1948 and June 1, 1948 for juniors and seniors, respectively; and ended on June 1, 1949. The last session for freshmen and sophomores began on Sept. 13, 1948 and ended June 1, 1949. The present session began on June 6, 1949 and June 1, 1949 respectively, for the juniors and seniors and will end June 3, 1950, and will begin on Sept. 12, 1949 for the freshmen and sophomores and will end June 3, 1950. The Dean is Willard C. Rappleye, M.D.

**Cornell University Medical College,** 1300 York Avenue.—Organized in 1898. Coeducational since organization. First year teaching was given formerly to approximately one third of the class at Ithaca but in 1938 this division was discontinued and all instruction is now in New York City. All students admitted are from colleges approved for premedical training. The requirement for admission is three years of college work. The fees average $700 per year. The registration for 1948-1949 was 319; graduates 69. The last session began for senior students July 12, 1948 and ended June 15, 1949. The freshman, sophomore and junior classes began Sept. 15, 1948 and ended June 15, 1949. The next session for seniors began on July 11, and the remaining three classes will begin Sept. 15 and all classes will end June 14, 1950. The Dean is Joseph C. Hinsey, Ph.D.

**New York Medical College, Flower and Fifth Avenue Hospitals,** 1 East 105th Street, N. Y. 9.—Organized in 1858. Incorporated in 1860 as the Homeopathic Medical College of the State of New York. The title New York Homeopathic Medical College was assumed in 1869; the title New York Homeopathic Medical College and Hospital in 1887; the title New York Homeopathic Medical College and Flower Hospital in 1908; the title New York Medical College and Flower Hospital in 1936; the present title of New York Medical College, Flower and Fifth Avenue Hospitals, June 22, 1938. The first class graduated in 1861. Coeducational since 1919. Three years of college work is the minimum requirement for admission but a degree is preferred. The fees average $740 per academic year. The registration for 1948-1949 was 446; graduates 95. The last session began Sept. 20, 1948 and ended June 8, 1949. The next session will begin Sept. 19, 1949 and will end June 7, 1950. The President and Dean is J. A. W. Hetrick, M.D.

**New York University College of Medicine,** 477 First Avenue, Zone 16. This is the undergraduate medical college of the New York University-Bellevue Medical Center which comprises also the Post-Graduate Medical School and the University Hospital.—The Medical Department of New York University (then called the University of the City of New York) was organized in 1841 as the University Medical College. In 1898 it united with the Bellevue Hospital Medical College, organized in 1861, under the name of University and Bellevue Hospital Medical College. In 1935 the name was changed to New York University College of Medicine. In 1947 the charter of the University and the statutes were amended, establishing the New York University-Bellevue Medical Center, which includes the College of Medicine. Coeducational since 1919. Entrance requirements give preference to those who have completed not less than three full years in an approved college of arts and sciences. The fees average $650 per academic session. The registration for 1948-1949 was 478; graduates 112. The last session began Sept. 20, 1948 and ended May 27, 1949 for freshmen, sophomores and seniors, and June 17, 1949 for juniors. The next session for all classes will begin Sept. 19, 1949, and will end May 20, 1950 for freshmen and sophomores, June 10, 1950 for juniors and May 13, 1950 for seniors. The Dean is Currier McEwen, M.D.

### Rochester

**University of Rochester School of Medicine and Dentistry,** 260 Crittenden Boulevard, Zone 7.—Organized in 1925 as the Medical Department of the University of Rochester. Coeducational since organization. Three years of collegiate work are required for admission. The fees are $600 per academic year. The registration for 1948-1949 was 268; graduates 68. The last session began Sept. 29, 1948 and ended June 18, 1949. The next session will begin on Sept. 19, 1949 and will end on June 17, 1950. The Dean is George H. Whipple, M.D.

### Syracuse

**Syracuse University College of Medicine,** 766 Irving Avenue, Zone 10.—Organized in 1872, when the Geneva Medical College, chartered in 1834, was removed to Syracuse, under the title "The College of Physicians and Surgeons of Syracuse University." Present title assumed in 1875, when a compulsory three year graded course was established. The first class graduated in 1873 and a class graduated each subsequent year. In 1889 the amalgamation with the university was made complete. Course extended to four years in 1896. Coeducational since organization. Three years of a recognized college course are required for admission. The fees average $800 per academic year. The registration for 1948-1949 was 191; graduates 46. The last session began Sept. 7, 1948 and ended June 6, 1949. The next session for all classes will begin approximately Sept. 6, 1949 and will end June 5, 1950. The Dean is H. G. Weiskotten, M.D.

## NORTH CAROLINA

### Durham

**Duke University School of Medicine.**—Organized in 1930. The first class was admitted Oct. 1, 1930. Coeducational. The premedical requirement is three years of college work. The academic year consists of two semesters in the first year and three quarters each in the sophomore, junior and senior years. There is no summer quarter between the first and second year, but in the two clinical years the subjects of the autumn, winter and spring terms are repeated in the summer quarter. This accelerated schedule is optional, and students may take the two semesters of their first year, and three quarters in each of their subsequent years, and receive their certificates in four calendar years, or if they receive permission from the curriculum committee they may at the end of their second year take the clinical quarters given during the summers and receive their certificates in three and one quarter calendar years. The B.S. degree in medicine may be conferred for special work after six quarters. Students are urged to spend three years in hospital or laboratory work after graduation and must give assurance satisfactory to the executive committee that they will spend at least two years. Active duty with the Army, Navy or Public Health Service can replace the second year. The fees are $750 for three quarters. The registration for 1948-1949 was 277; graduates 59. During 1949 the quarters begin Jan. 3, March 28, July 5, Oct. 3, and end March 19, June 11, Sept. 17 and Dec. 17. The next freshman class will be enrolled Oct. 3, 1949 and will end June 10, 1950. The Dean is Wilburt C. Davison, M.D.

### Winston-Salem

**Bowman Gray School of Medicine of Wake Forest College,** Zone 7.—Organized in 1902 at Wake Forest as a school offering only the first two years of the curriculum. In 1941 the school was moved to Winston-Salem and expanded to a complete four year medical school under its present name. Coeducational. Ninety semester hours of college work are required for admission. Clinical departments operate four quarters in the year; however, the plan of operation makes it possible for students to be out of school during one quarter of each of the clinical years for research, for study elsewhere, or for earning money to help defray expenses for their education. Tuition is $600 per school year. The registration for 1948-1949 was 186; graduates 38. The last session for the freshman class began Oct. 4, 1948; sophomores Oct. 4, 1948; juniors July 12, 1948, and seniors March 29, 1948; and ended for freshmen, sophomores, and juniors on June 11, 1949; and for seniors Dec. 18, 1948. The present junior and senior classes began July 11, 1949, and will end June 10, 1950. The next freshman and sophomore classes will begin Oct. 3, 1949, and will end June 10, 1950. The Dean is C. C. Carpenter, M.D.

## OHIO

### Cincinnati

**University of Cincinnati College of Medicine,** Eden and Bethesda Avenues.—Organized in 1909 by the union of the Medical College of Ohio (founded in 1819) with the Miami Medical College (founded in 1852). The Medical College of Ohio became the Medical Department of the University of Cincinnati in 1896. Under a similar agreement, March 2, 1909, the Miami Medical College also merged with the University when the title of Ohio-Miami Medical College of the University of Cincinnati was taken. Present title assumed in 1915. Coeducational since organization. Three years of collegiate work are required for admission. Liberal arts students of the University of Cincinnati may enroll for the seven year combined liberal arts and medical program. The B.S. degree is granted on the joint recommendation of the faculties of the College of Liberal Arts and Medicine at the end of the first medical year. Tuition is as follows: for legal residents of Cincinnati $525 a year plus breakage fees ($125 additional for those not legal residents). The registration for 1948-1949 was 327; graduates 78. The last session for freshmen, sophomores, juniors and seniors began Sept. 27, 1948 and ended June 4, 1949. The next session for all classes will begin Sept. 26, 1949 and will end June 3, 1950. The Dean is Stanley Dorst, M.D.

### Cleveland

**Western Reserve University School of Medicine,** 2109 Adelbert Road, Zone 6.—Organized in 1843 as the Cleveland Medical College in cooperation with Western Reserve College. The first class graduated in 1844. The school assumed the present title in 1881. In 1910 the Cleveland College of Physicians and Surgeons was merged. Coeducational since 1919. Students are required to have three years of college work for admission. The fees average $800 per academic year. The registration for 1948-1949 was 325; graduates 75. The last session began Sept. 15, 1948 and ended June 4, 1949. The next session will begin Sept. 21, 1949, for freshmen and sophomores, Sept. 14, 1949, for juniors, and will end June 3, 1950; the senior session will begin Aug. 29, 1949 and will end June 14, 1950. The Dean is Joseph T. Wearn, M.D.

### Columbus

**Ohio State University College of Medicine,** Neil and Eleventh Avenues, Zone 10.—Organized in 1907 as the Starling-Ohio Medical College by the union of Starling Medical College (organized in 1847 by charter granted by the State Legislature changing the name from Willoughby Medical College, which was chartered March 3, 1834) with the Ohio Medical University (organized 1890). In 1914 it became an integral part of the Ohio State University with its present title. Coeducational since organization. Three years of collegiate work are required for admission. Tuition fees average $480 per academic year and $225 additional for nonresidents. The registration for 1948-1949 was 322; graduates 84. The last session began on Sept. 28, 1948 and ended June 10, 1949. The next session will begin Sept. 27, 1949, and end June 9, 1950. The Dean is Charles A. Doan, M.D.

## OKLAHOMA

### Oklahoma City

**University of Oklahoma School of Medicine,** 800 North East Thirteenth Street, Zone 4.—Organized in 1900. Until 1910 gave only the first two years of the medical course at Norman, Oklahoma, after which a clinical department was established at Oklahoma City through consolidation with the Medical School of Epworth University. The first class graduated in 1911. Coeducational since organization. A new medical school building and a second teaching hospital became available in 1928, and since September of that year the entire four year course has been given in Oklahoma City. Prerequisites for admission are three years—90 semester hours. The fees for residents of Oklahoma are $350; nonresidents, $700. The registration for 1948-1949 was 259; graduates 54. The last session began Sept. 20, 1948 and ended June 6, 1949. The next session will begin Sept. 19, 1949 and will end June 5, 1950 for the first three classes. The senior session began June 20, 1949 and will end June 5, 1950. The Dean is Mark R. Everett, Ph.D.

## OREGON

### Portland

**University of Oregon Medical School,** Marquam Hill, Zone 1.—Organized in 1887. The first class graduated in 1888, and a class graduated each subsequent year except 1898. The Willamette University Medical Department was merged in 1913. Coeducational since organization. Entrance requirement is three years of collegiate work. The total fees are, respectively, $388.50, $388.50, $383.50 and $383.50 for residents of Oregon and $150 a year additional for nonresidents. The registration for 1948-1949 was 273; graduates 59. The last session began Sept. 29, 1948 and ended June 17, 1949. The next session will begin Oct. 3, 1949 and will end June 16, 1950. The Dean is D. W. E. Baird, M.D.

## PENNSYLVANIA

### Philadelphia

**Hahnemann Medical College and Hospital of Philadelphia,** 235 North Fifteenth Street, Zone 2.—Incorporated in 1848 as The Homeopathic Medical College of Pennsylvania. In 1869, it and a corporation known from 1853 to 1867 as The Washington Medical College of Philadelphia and thereafter as The Hahnemann Medical College of Philadelphia were merged under the latter title. Assumed present title in 1885. The first class graduated in 1849. Coeducational beginning with 1941-1942 session. Three years of collegiate work in an approved college of arts and sciences are required for admission. Fees are respectively $755, $750, $750, $775. The registration for 1948-1949 was 368; graduates 98. The last session began for seniors Sept. 27, 1948 and ended June 24, 1949. The last session for juniors began Sept. 13, 1948 and ended June 24, 1949. The last session for sophomores began Sept. 27, 1948 and ended June 18, 1949. The last session for freshmen began Sept. 20, 1948 and ended June 18, 1949. The next session for all classes will begin Sept. 12, 1949 and will end June 3, 1950 for freshmen and sophomores, June 10, 1950 for juniors, and June 15, 1950 for seniors. The Dean is Charles L. Brown, M.D.

**Jefferson Medical College of Philadelphia,** 1025 Walnut Street.—Organized in 1825 as the Medical Department of Jefferson College, Canonsburg, Pa. It was chartered with its present title in 1838. Classes have been graduated annually beginning in 1826. In 1838 a separate university charter was granted without change of title, since which time it has

continued under the direction of its board of trustees. For the class entering in 1950 the minimum entrance requirement will be three years of college work. The tuition fee is $700 a year. The registration for 1948-1949 was 635; graduates 150. The last session began for freshmen on Sept. 13, 1948 and ended June 13, 1949; for sophomores, juniors and seniors on Sept. 15, 1948 and ended for sophomores and juniors on June 10, 1949, and for seniors on May 27, 1949. Graduation was on June 3, 1949. The next session will begin for all classes on Sept. 12, 1949 and will end on May 27, 1950. Graduation June 9, 1950. The Dean is Wm. Harvey Perkins, M.D.

**Temple University School of Medicine,** 3400 North Broad Street, Zone 40.—Organized in 1901. The first class graduated in 1904. Coeducational since organization. Three years of collegiate work are required for admission. The fees average $710 per academic year. The registration for 1948-1949, was 461; graduates 98. The last session began Sept. 20, 1948 and ended June 16, 1949. The next session will begin Sept. 19, 1949 and will end June 15, 1950. The Dean is William N. Parkinson, M.D.

**University of Pennsylvania School of Medicine.** Thirty-Sixth and Pine Streets.—Organized in 1765. Classes were graduated in 1768 and in all subsequent years except 1772 and 1775-1779, inclusive. The original title was the Department of Medicine, College of Philadelphia. The present title was adopted in 1909. It granted the first medical diploma issued in America. In 1916, it took over the Medico-Chirurgical College of Philadelphia to develop it as a graduate school. Coeducational since 1914. Three years of collegiate work are required for admission. The tuition fee is $700, with a deposit fee of $15, a general fee including student health of $15 and a matriculation fee of $5. The registration for 1948-1949 was 474; graduates 120. The last session began Sept. 27, 1948 and ended June 15, 1949. The next session will begin Sept. 25, 1949 and will end June 14, 1950. The Dean is John McK. Mitchell, M.D.

**Woman's Medical College of Pennsylvania,** Henry Avenue and Abbottsford Road, Zone 29.—Organized in 1850. Classes were graduated in 1852 and in all subsequent years except 1862. At least three years of collegiate work are required for admission and candidates with a degree are given preference. The curriculum covers four years of eight and one-half to nine months each. Total fees are $675 yearly. The registration for 1948-1949 was 161; graduates 30. The last session began Sept. 8, 1948 and ended June 16, 1949. The next session will begin Sept. 7, 1949 and will end June 15, 1950. The Dean is Marion Fay, Ph.D.

### Pittsburgh

**University of Pittsburgh School of Medicine,** 3941 O'Hara Street.—Organized in 1886, as the Western Pennsylvania Medical College and in 1908 became an integral part of the University of Pittsburgh, removing to the university campus in 1910. The first class graduated in 1887. Coeducation since 1890. Entrance requirements are three years of collegiate work. The total fees are $556 each year. The registration for 1948-1949 was 383; graduates 68. The last session began Sept. 13, 1948 and ended June 8, 1949. The next session will begin on Sept. 12, 1949 and will end June 14, 1950. The Dean is William S. McElroy, M.D.

## SOUTH CAROLINA

### Charleston

**Medical College of the State of South Carolina,** 16 Lucas Street, Zone 16.—Organized 1823 as the Medical College of South Carolina. The first class graduated in 1825. In 1832 a medical college bearing the present title was chartered and the two schools continued as separate institutions until they merged in 1838. Classes were graduated in all years except 1862 to 1865, inclusive. Coeducational from 1895 to 1912, when privileges for women were withdrawn, being restored in 1917. At least three years of collegiate work are required for admission. The total fees average $425 each year for residents of South Carolina and $625 for nonresidents of the state. The registration for 1948-1949 was 216; graduates 42. The last session began on Sept. 23, 1948 and ended June 2, 1949. The next session will begin on Sept. 22, 1949 and will end June 1, 1950. The Dean is Kenneth M. Lynch, M.D.

## TENNESSEE

### Memphis

**University of Tennessee College of Medicine,** 874 Union Avenue, Zone 3.—Organized in 1876, at Nashville as Nashville Medical College. First class graduated in 1877, and a class graduated each subsequent year. Became Medical Department of University of Tennessee in 1879. In 1909 it united with the Medical Department of the University of Nashville to form the joint Medical Department of the Universities of Nashville and Tennessee. This union was dissolved in 1911. The trustees of the University of Nashville by formal action of that board named the University of Tennessee College of Medicine as its legal successor. In 1911 it moved to Memphis, where it united with the College of Physicians and Surgeons. The Memphis Hospital Medical College was merged in 1913, Lincoln Memorial University Medical Department was merged in 1914. Coeducational since 1911. Two years of collegiate work are required for admission. The B.S. degree is conferred on students completing the science-medical curriculum of the University. The fees are $175 quarterly. For residents of the state the charge is reduced $50 each quarter. The registration for 1948-1949 was 578; graduates 112. During the next academic year the quarters begin September, January, March and July. The Dean is O. W. Hyman, Ph.D.

### Nashville

**Meharry Medical College,** Eighteenth Avenue North and Meharry Boulevard, Zone 8 (For Negro Youth).—Organized in 1876 as the Meharry Medical Department of Central Tennessee College, which became Walden University in 1900. First class graduated in 1877. Obtained new charter independent of Walden University in 1915. Coeducational since 1876. Two years of college work in a school of liberal arts are required for admission. Tuition and fees are: first year $505, second year $495, third year $485, fourth year $495. The curriculum covers four academic years of thirty-six weeks each. In Sept. 1942, Meharry Medical College instituted the quarter system. The registration for 1948-1949 was 231; graduates 43. The last session began on Sept. 27, 1948 and ended on June 6, 1949. The next session begins on Sept. 26, 1949 and will end on June 5, 1950. The Director of Medical Education is Murray C. Brown, M.D.; the Dean is Michael J. Bent, M.D.

**Vanderbilt University School of Medicine,** Twenty-First Avenue South at Edgehill, Zone 4.—This school was founded in 1874. The first class graduated in 1875. Coeducational since 1925. For matriculation, students must be graduates of collegiate institutions of recognized standing or seniors in absentia, who will receive the bachelor degree from their college after having completed successfully one year of work in the school of medicine. The course covers four academic years of nearly nine months each. The fees average $615 per academic year. The registration for 1948-1949 was 200; graduates 47. The last session began Sept. 27, 1948 and ended June 5, 1949. The next session will begin Sept. 26, 1949 and will end June 5, 1950. The Dean is Ernest W. Goodpasture, M.D.

## TEXAS

### Dallas

**Southwestern Medical School of the University of Texas,** 2211 Oak Lawn.—Organized in 1943. The first class graduated March 20, 1944. Coeducational since organization. Became a branch of the University of Texas, Sept. 1, 1949. The medical college is operated on the regular program offering three terms of twelve weeks each per academic year. The tuition fees for residents are $50 per year. The nonresident fee is $300 per year. Ninety semester hours are required for admission. Registration 1948-1949 was 238; graduates 56. The last session began Sept. 8, 1948 and ended June 6, 1949. Next session will begin Sept. 1, 1949 and will end June 5, 1950. The Dean is W. Lee Hart, M.D.

### Galveston

**University of Texas School of Medicine,** 900 Strand St.—Organized in 1890. The first class graduated in 1892. Coeducational since organization. Ninety semester hours are required for admission to the freshman class matriculating in September 1949, but students are urged to complete the baccalaureate degree if possible prior to matriculation. The fees average $113 per academic year, including health fees for medical care and hospitalization. The registration for 1948-1949 was 374. Graduates on June 10, 1949 were 69. The last session began on Sept. 20, 1948 and ended on June 10, 1949. The next freshman class will matriculate on Sept. 19, 1949, and the sophomore, junior, and senior classes will matriculate on Sept. 26, and all classes will end June 9, 1950. The Vice President is Chauncey D. Leake, Ph.D., and D. Bailey Calvin, Ph.D., is Dean of Student and Curricular Affairs.

### Houston

**Baylor University College of Medicine,** Texas Medical Center.—Organized in 1900 at Dallas as the University of Dallas Medical Department. In 1903 it took its present name and became the Medical Department of Baylor University. It acquired the charter of Dallas Medical College in 1904. The school was moved to Houston in 1943. Coeducational since organization. The first class graduated in 1903. Entrance requirements are 90 semester hours of collegiate work. The course covers four years of eight months each. The fees are respectively $556, $546, $531, $556. The registration for 1948-1949 was 386; graduates 62. The last session began Oct. 4, 1948 and ended June 13, 1949. The next session will begin Oct. 3, 1949 and will end June 12, 1950. The Dean is W. H. Moursund, M.D.

## UTAH

### Salt Lake City

**University of Utah College of Medicine.**—Organized in 1906. Coeducational since organization. Four year curriculum established March 1943. Three years of collegiate work are required for admission. The University of Utah has accepted in principle the policy of acceleration by graduating a class in three calendar years (4 academic years), but will admit only one class annually. The next freshman class will be admitted in June, 1950. All subsequent freshman classes will begin in June of each year. Classes are scheduled during four academic quarters (11-12 wks.) each calendar year. An entering first year student may be graduated in 12 academic quarters (3 calendar years) after date of admission; attendance during the summer quarter being required. Applications for admission (complete) must be submitted 9 months prior to opening date. The fees for each quarter average $151.50 (Resident); there is a non-resident fee of $50.00 each quarter. The registration for 1948-1949 was 194; graduates 67. The last session began for freshmen June 1948 and ended March 1949. The present session for freshmen began June 20, 1949 and will end March 1950. The present session for

sophomores began March 1949 and will end Dec. 1949. The present session for juniors began Jan. 1949 and will end Sept. 1949. The present session for seniors will begin Sept. 1949 and end June 1950. The Acting Dean is H. L. Marshall, M.D.

## VERMONT

### Burlington

**University of Vermont College of Medicine**, Pearl Street, College Park. Organized with complete course in 1822. Classes graduated in 1823 to 1836, inclusive, when the school was suspended. It was reorganized in 1853 and classes were graduated in 1854 and in all subsequent years. Coeducational since 1920. Three years of college work are required for admission. For residents of Vermont the tuition fee averages $350 per session. Nonresidents are charged an additional $150 each session. A $25 fee is charged for the doctor's degree. Registration for 1948-1949 was 148; graduates 34. The last session for freshmen, sophomores and juniors began Sept. 18, 1948 and ended June 20, 1949. The last senior class began July 3, 1948 and graduated June 20, 1949. The present senior class began July 5, 1949; the next freshman, sophomore and junior classes will begin Sept. 17, 1949 and all classes will end June 12, 1950. The Dean is William Eustis Brown, M.D.

## VIRGINIA

### Charlottesville

**University of Virginia Department of Medicine.**—Organized in 1827. Classes were graduated in 1828 and in all subsequent years except 1865. Coeducational since the session of 1920-1921. Three years of college work are required for admission. For residents of Virginia the average tuition fee is $430 per academic year; for nonresidents, $600. The registration for 1948-1949 was 262; graduates 56. The last session began Sept. 14, 1948 and ended June 13, 1949. The next session will begin Sept. 14, 1949 and will end June 12, 1950. The Dean is Vernon W. Lippard, M.D.

### Richmond

**Medical College of Virginia**, Twelfth and Marshall Streets.—Organized in 1838 as the Medical Department of Hampden-Sydney College. Present title was taken in 1854. In 1913 the University College of Medicine was merged. In 1914 the North Carolina Medical College was merged. Coeducational since 1918. Classes were graduated in 1839 and in all subsequent years. Three years of collegiate work, as a minimum, are required for admission. Preference, however, is given to applicants with a baccalaureate degree. Fees average $510 per academic year. Nonresidents are charged an additional $200 each year. The registration for 1948-1949 was 326; graduates 68. The last session began Sept. 13, 1948 for second, third and fourth year classes and ended June 7, 1949. The last session for the first year class began Sept. 9, 1948 and ended June 7, 1949. The subsequent session will begin Sept. 8, 1949 for the first year class and Sept. 12, 1949 for the second, third and fourth year classes and will end June 6, 1950. The Dean is Harvey B. Haag, M.D. The Associate Dean and Chairman of the Admissions Committee is Mr. George W. Bakeman.

## WISCONSIN

### Madison

**University of Wisconsin Medical School**, 418 North Randall Avenue, Zone 6.—Organized 1907. Gave only the first two years of the medical course until 1925, when the clinical years were added. Coeducational since organization. The entrance requirement is three years of collegiate work. Fees for the first, second and third years $310, for the fourth year $220 per academic year for residents. An additional fee of $300 per year is charged nonresidents. Registration for 1948-1949 was 293; graduates 56. The last session for freshman, sophomore and junior students began Sept. 20, 1948 and ended June 17, 1949. The present senior class began June 28, 1948 and ended June 17, 1949. Freshman, sophomore and junior classes will begin Sept. 19, 1949 and will end June 17, 1950. The senior class began June 27, 1949 and will end June 17, 1950. The Dean is William S. Middleton, M.D.

### Milwaukee

**Marquette University School of Medicine**, 561 North Fifteenth Street.—Organized in December 1912 by the merger of the Milwaukee Medical College and the Wisconsin College of Physicians and Surgeons. Coeducational since organization. Three years of collegiate work are required for admission. The fees are $650 per academic year. The registration for the 1948-1949 session was 377; graduates 73. The last session began Sept. 27, 1948 and ended June 4, 1949. The last senior class began July 5, 1948 and ended June 12, 1949. The next session for freshman, sophomore, and junior students will begin Sept. 26, 1949 and will end May 27, 1950. The present session for seniors began June 13, 1949 and will end June 10, 1950. The Dean is John S. Hirschboeck, M.D.

# APPROVED MEDICAL SCHOOLS IN CANADA

## Alberta

**University of Alberta Faculty of Medicine**, Edmonton.—Organized in 1913. Coeducational since organization. Has given complete medical course since 1924. New course—three years premedical, four years of medicine—offered with the session 1947-1948. Tuition for the four years is $400 per session. The registration for 1948-1949 was 180; graduates, 34. The last session began Sept. 7, 1948 and ended June 15, 1949. The next regular session will begin Sept. 6, 1949 and end June 15, 1950. The Dean is John W. Scott, M.D.

## Manitoba

**University of Manitoba Faculty of Medicine**, Bannatyne Avenue, Winnipeg.—Organized in 1883 as Manitoba Medical College. First class graduated in 1886, and a class graduated each subsequent year. The college transferred all its property to the Universityof Manitoba in 1919 and assumed the present title. Coeducational since organization. Matriculation requirements include three years of collegiate work in the faculty of arts and sciences of a recognized university. The course extends over four years of eight months each and a hospital internship. The fees average $405.75 yearly. The registration for 1948-1949 was 288; graduates 59. The last session began Sept. 8, 1948 and ended May 15, 1949. The next session will begin on Sept. 9, 1949 and will end on May 15, 1950. The Dean is Alvin T. Mathers, M.D.

## Nova Scotia

**Dalhousie University Faculty of Medicine**, Morris Street, Halifax.—Organized in 1867. Incorporated as the Halifax Medical College in 1875. Reorganized as an examining faculty, separate from the Halifax Medical College, in 1885. In 1911, in accordance with an agreement between the Governors of Dalhousie University and the Corporation of the Halifax Medical College, the work of the latter institution was discontinued and a full teaching faculty was established by the university. First class graduated in 1872. Coeducational since 1871. Requires for matriculation two years of arts. The regular medical course covers four years and a hospital internship of one year approved by the medical faculty. The fees average $395.25 yearly; nonresidents $250.00 additional fee. The last session for freshmen, sophomores and juniors began Sept. 14, 1948 and for seniors May 3, 1948; all classes ended May 17, 1949. The registration for 1948-1949 was 215; graduates 43. The next session for all classes will begin Sept. 6, 1949 and will end May 16, 1950. The Dean is H. G. Grant, M.D.

## Ontario

**Queen's University Faculty of Medicine**, Kingston.—Organized in 1852. First class graduated in 1855 and a class graduated each subsequent year. Fees for the first year amount to $342.50 and for each of the other five years $358.50. The course consists of six sessions of 30 teaching weeks, the sixth session being devoted entirely to clinical work in the hospitals affiliated with the University. This latter is not considered an internship. The degrees awarded are M.D., C.M. Freshmen will be admitted annually. Registration for 1948-1949 was 325; graduates 43. The last session began Sept. 27, 1948, and ended May 14, 1949. The next session will begin Sept. 19, 1949, and will end May 13, 1950. The last Convocation was held on June 4, 1949. The Dean is G. Spencer Melvin, M.D.

**University of Western Ontario Faculty of Medicine**, 346 South Street, London.—Organized in 1881 as the Western University Faculty of Medicine. First class graduated in 1883 and a class graduated each subsequent year. Present title in 1923. The Faculty of Medicine has been under the control of the Board of Governors of the University of Western Ontario since 1913. Coeducational since 1913. The normal course of study covers two honor college years of nine months each and four years of nine months each in the Faculty of Medicine. The total fees to residents of Canada for the last four years are $450 a year. The registration for 1948-1949 was 264; graduates 52. The last session began Sept. 13, 1948 and ended May 26, 1949. The next session begins Sept. 12, 1949 and ends May 25, 1950. The Dean is J. B. Collip, M.D.

**University of Toronto Faculty of Medicine**, Toronto 5.—Organized in 1843 as the Medical Faculty of King's College. Abolished in 1853. Reestablished in 1887. In 1902 it absorbed Victoria University Medical Department and in 1903 it absorbed the Medical Faculty of Trinity University. Coeducational since 1903. The degree of M.D. is conferred after 4 years in the study of medicine. Admission to the medical course is gained following honour matriculation and after two years in the study of premedical requisites in the University of Toronto. A certain number are admitted each year to the first medical year who hold Arts degrees from recognized universities and who have covered the necessary work in the humanities and sciences. The B.Sc. (Med.) degree may be conferred for special work or investigation as a graduate degree, or under certain circumstances for an extra year's work as an undergraduate. The registration for 1948-1949 in the medical and premedical years was 964; graduates 154. The next session for first and second premedical years will begin on Sept. 21, 1949 and for first, second, third and fourth medical years on Sept. 19, 1949. The session for premedical years will end on April 29, 1950 and for medical years on May 13, 1950. Students will graduate annually in June. The Dean is J. A. MacFarlane, M.B.

### Quebec

**McGill University Faculty of Medicine,** 3640 University Street, Montreal.—Founded in 1823 as Montreal Medical Institution; became the Medical Faculty of McGill University in 1829; first class graduated under the university auspices in 1833. No session between 1836-1839, owing to political troubles. In 1905 it absorbed the Faculty of Medicine of the University of Bishop's College. Coeducational since 1917. Four years of collegiate work are required for admission. The total fees for each of the four medical years are $465. The registration for 1948-1949 was 465; graduates 128. The last session began Sept. 8, 1948 and ended June 4, 1949 for the first three classes and April 30 for the senior class. The next session will begin Sept. 7, 1949 and will end June 1, 1950 for the first three classes and April 29, 1950 for the seniors. The Dean is Frederick Smith, M.D.

**University of Montreal Faculty of Medicine,** 2900 Mount Royal Boulevard, Montreal.—Organized in 1843 as the Montreal School of Medicine and Surgery. In 1891, by Act of Parliament, the Medical Faculty of Laval University (organized in 1878) was absorbed. Present name by Act of Parliament in 1920. A class was graduated in 1843 and each subsequent year. Coeducational since 1925. The requirements for admission are: First, a B.A. degree (or its equivalent); second, one year premedical in the faculty of pure sciences (or an entrance examination on the premedical subjects). An internship is required for graduation. The fees average $285 yearly for residents and $342 for nonresidents. The registration for 1948-1949 was 482; graduates 83. The last session began Sept. 15, 1948 and ended May 14, 1949. The next session will begin Sept. 14, 1949 and will end May 13, 1950. The Dean is Edmond Dubé, M.D.

**Laval University Faculty of Medicine,** Quebec.—The Quebec School of Medicine, organized in 1848, became in 1852 the Laval University Faculty of Medicine; first class graduated in 1855, and a class graduated each subsequent year. The fees for each of the medical years average $226 for residents of Canada. Nonresidents are charged an extra fee of $200 each year. The premedical requirement is a B.A. degree or its equivalent. The registration for 1948-1949 was 465; graduates 83. The last session began Sept. 15, 1948 and ended June 1, 1949. The next session will begin Sept. 14, 1949 and will end June 1, 1950. The Dean is Charles Vézina, M.D.

## APPROVED SCHOOLS OF THE BASIC MEDICAL SCIENCES IN THE UNITED STATES

### MISSISSIPPI

#### University

**University of Mississippi School of Medicine.**—Organized in 1903. Coeducational since organization. A clinical department was established at Vicksburg in 1908 but was discontinued in 1910 after graduating one class. Entrance requirement is three years of collegiate work or ninety semester hours of credit. Fees average $410.50 annually. There is a nonresident fee of $200. The school operates on an accelerated program by accepting two freshman classes each session. The registration for 1948-1949 was 111. The last session began Sept. 20, 1948 and ended May 28, 1949. Additional freshman class admitted January 4, 1949 and will complete the year Oct. 29, 1949. The sophomore session began July 6, 1948 and ended March 19, 1949. An additional sophomore session began November 1, 1948 and ended July 9, 1949. The next freshman class will begin Sept. 5, 1949 and will end May 27, 1950. The next sophomore class will begin July 5, 1949 and will end March 11, 1950. The Dean is David S. Pankratz, M.D.

### MISSOURI

#### Columbia

**University of Missouri School of Medicine.**—Organized at St. Louis in 1845; was discontinued in 1855 but was reorganized at Columbia in 1872. Teaching of the clinical years was suspended in 1909. Coeducational since 1872. The entrance requirements are 90 semester hours of collegiate work. The B.S. degree in medicine is conferred at the end of the second year. Total fees for the first year are $236.50, for the second $230.50. The registration for 1948-1949 was 87. The last session began Sept. 17, 1948 and ended June 7, 1949. The next session begins Sept. 15, 1949 and will end June 9, 1950. The Dean is Trawick H. Stubbs, M.D.

### NEW HAMPSHIRE

#### Hanover

**Dartmouth Medical School.**—Organized by Dr. Nathan Smith in 1797. The first class graduated in 1798. It is under the control of the Trustees of Dartmouth College. Courses of the third and fourth years were discontinued in 1914. Three years of college work and candidacy for the bachelor's degree are required for admission. Candidates for the A.B. degree in Dartmouth College may substitute the work of the first year in medicine for that of the senior year. The tuition is $675 for each year. The registration for 1948-1949 was 46. The last session began on Sept. 27, 1948 and ended June 12, 1949. The next session will begin Sept. 18, 1949 and will end June 11, 1950. The Dean is Rolf C. Syvertsen, M.D.

### NORTH CAROLINA

#### Chapel Hill

**University of North Carolina School of Medicine.**—Organized in 1890. Until 1902 this school gave only the work of the first two years, when the course was extended to four years by the establishment of a department in Raleigh. The first class was graduated in 1903. A class was graduated each subsequent year, including 1910, when the clinical department at Raleigh was discontinued. Coeducational since 1914. Three years of college work are normally required for admission. Certificates are awarded on the completion of two years' work in medicine. The fees are $450 per year for residents; for nonresidents an additional fee of $300 per year. The registration for 1948-1949 was 110. The North Carolina Legislature of 1947 appropriated funds for the expansion of the school to the full four years. The full program will probably not get under way for two to three years. The last session began Sept. 20, 1948, and ended June 4, 1949. The next session will begin Sept. 19, 1949, and end June 5, 1950. The Dean is W. Reece Berryhill, M.D.

### NORTH DAKOTA

#### Grand Forks

**University of North Dakota School of Medicine.**—Organized in 1905. Offers only the first two years of the medical course. Coeducational since organization. Three years work in a college of liberal arts are required for admission. The B.S. degree in combined arts-medical course is conferred at the end of the second year. The fees are $150 each year for resident students and $225 for nonresidents. The registration, academic year 1948-1949, was 58. The last session began Sept. 20, 1948 and ended June 10, 1949. The next session will begin Sept. 19, 1949 and will end June 2, 1950. The Dean is W. F. Potter, M.D.

### SOUTH DAKOTA

#### Vermillion

**University of South Dakota School of Medical Sciences.**—Organized in 1907 as the University of South Dakota School of Medicine. Present title in 1937. Coeducational since organization. Offers only the first two years of the medical course. Three years work in a college of liberal arts are required for admission. Students who complete the third year of premedical work in the College of Arts and Sciences at the University of South Dakota may apply the work of the first year of medicine to an A.B. degree.: The B.S. degree is conferred at the end of the second year on those students who do not hold a combination (Arts and Sciences and Medicine Course) A.B. degree. The tuition is $309 for first year residents and $324 for second year residents; $519 for first year nonresidents and $544 for second year nonresidents. The registration for 1948-1949 was 56. The last session began Sept. 6, 1948 and ended May 28, 1949. The next session will begin Sept. 5, 1949 and will end May 27, 1950. The Dean is Donald Slaughter, M.D.

### WEST VIRGINIA

#### Morgantown

**West Virginia University School of Medicine.**—Organized in 1902. Gives the first two years of the medical course, but agreement has been made for the transfer of 20 students each year to the Medical College of Virginia. Coeducational since organization. Entrance requirements are three years of collegiate work. The B.S. degree is conferred at the end of the second year. Fees for residents of the state are, respectively, $258 and $268; nonresidents, $150 additional each year. The registration for 1948-1949 was 56. The last session began Sept. 13, 1948 and ended May 30, 1949. The next session will begin Sept. 19, 1949 and will end June 5, 1950. The Dean is Edward J. Van Liere, M.D.

## APPROVED SCHOOL OF THE BASIC MEDICAL SCIENCES IN CANADA

### Saskatchewan

**University of Saskatchewan School of Medical Sciences,** Saskatoon. Organized in 1926. Coeducational. Offers the first two years of the medical course. Two years of collegiate work are required for admission. The B.A. degree is conferred at the end of the second year. The fees are $380. The registration for 1948-1949 was 63. The last session for freshmen began Sept. 20, 1948 and ended June 14, 1949. The next session will begin Sept. 20, 1949 and will end June 20, 1950. The Dean is W. S. Lindsay, M.B.

## APPROVED EXAMINING BOARDS IN MEDICAL SPECIALTIES

Examining and certifying boards in nineteen specialties have been approved by the Council on Medical Education and Hospitals of the American Medical Association. The American Board of Ophthalmology, the first of the examining boards in the specialties, was organized in 1917. Four additional boards were organized by 1933. In 1934 the Council formulated minimal standards governing specialty boards. The boards then in existence were subsequently approved as well as boards formed in later years. Three specialty boards were added to the group in 1949, when the American Board of Preventive Medicine and Public Health, the American Board of Proctology and the Board of Thoracic Surgery were approved. The Board of Thoracic Surgery has been approved as a subsidiary board of the American Board of Surgery. The accompanying table gives the date of activation of each board. The boards in pathology, psychiatry and neurology and radiology confer certificates in special divisions of their specialty as follows:

Candidates who have met all the general requirements of the American Board of Pathology and who have successfully passed the examination in pathologic anatomy and clinical pathology may apply for special designation of the subspecialty of pathologic anatomy or clinical pathology. In addition, after an accepted candidate has successfully passed a prescribed examination, the board will issue a certificate reading "Pathologic Anatomy (Neuropathology)" or "Clinical Pathology (Clinical Bacteriology)."

Under certain conditions candidates may apply for certification in a special field only, such as "Neuropathology" and "Clinical Bacteriology." This procedure has been in effect since July 1, 1948.

The American Board of Psychiatry and Neurology confers separate certificates in psychiatry and in neurology and two certificates or a combined certificate for those qualified in both fields.

Certificates of the American Board of Radiology are issued on one of two forms as follows: (1) a certificate to the effect that the applicant is qualified to practice radiology in all its branches and (2) a certificate to the effect that the applicant is qualified to practice radiology in one or more of the following special fields: (*a*) roentgenology, (*b*) diagnostic roentgenology and (*c*) therapeutic radiology.

Since the publication of the last Educational Number in 1948, the American Board of Physical Medicine has broadened its functions to include the field of rehabilitation, and the board is now known as the American Board of Physical Medicine and Rehabilitation.

Three boards have certified candidates in subspecialties. The American Board of Internal Medicine certifies in allergy, cardiovascular disease, gastroenterology and pulmonary diseases. The American Board of Pediatrics certifies in allergy. Until the formation of an independent board in proctology in 1949, the American Board of Surgery certified candidates in this field as a subspecialty. Regular board certification is a prerequisite for certification in the subspecialty. The certifying of specialists in subspecialties by these boards is also approved by the Council.

In addition to certifying specialists in otolaryngology, the American Board of Otolaryngology issues a limited certificate in endoscopy to an exceptionally qualified person. Two such certificates have been awarded to date.

Each of the American Boards has published a booklet containing a list of its officers and a brief statement of its organization, purposes and qualifications for eligibility for certification. The current data pertaining

TABLE 24.—*Approved Examining Boards in Medical Specialties*

| Key No. | Name of Board | Year of Activation | Total Certificates Awarded to March 1, 1948 | Total Certificates Awarded to July 1, 1949 |
|---|---|---|---|---|
| 1 | American Board of Pediatrics | 1933 | 2,749 | 3,007 |
| 2 | American Board of Psychiatry and Neurology | 1934 | 2,819 | 3,242 |
| 3 | American Board of Orthopaedic Surgery | 1934 | 1,214 | 1,352 |
| 4 | American Board of Dermatology and Syphilology | 1932 | 972 | 1,119 |
| 5 | American Board of Radiology | 1934 | 2,622 | 3,027 |
| 6 | American Board of Urology | 1935 | 1,245 | 1,345 |
| 7 | American Board of Obstetrics and Gynecology | 1930 | 2,405 | 2,875 |
| 8 | American Board of Internal Medicine | 1936 | 5,008 | 5,807 |
| 9 | American Board of Pathology | 1936 | 1,462 | 1,649 |
| 10 | American Board of Ophthalmology | 1917 | 2,657 | 2,860 |
| 11 | American Board of Otolaryngology | 1924 | 4,085 | 4,262 |
| 12 | American Board of Surgery | 1937 | 3,272 | 3,839 |
| 13 | American Board of Anesthesiology | 1937 | 417 | 524 |
| 14 | American Board of Plastic Surgery | 1937 | 172 | 200 |
| 15 | American Board of Neurological Surgery | 1940 | 228 | 303 |
| 16 | American Board of Physical Medicine and Rehabilitation | 1947 | 86 | 140 |
| 17 | American Board of Preventive Medicine and Public Health | 1948 | ..... | 277 |
| 18 | American Board of Proctology | 1949 | ..... | ..... |
| 19 | Board of Thoracic Surgery (Subsidiary Board of the American Board of Surgery) | 1948 | ..... | 174* |
| | Totals | | 31,416 | 35,888 |
| | **Certification in Subspecialties** | | | |
| | By the American Board of Internal Medicine | | | |
| | Allergy | | 106 | 124 |
| | Cardiovascular Disease | | 382 | 420 |
| | Gastroenterology | | 208 | 240 |
| | Pulmonary Disease | | 174 | 185 |
| | By the American Board of Pediatrics | | | |
| | Allergy | | 32 | 42 |
| | By the American Board of Surgery | | | |
| | Proctology | | 80 | 81 |
| | Totals | | 982 | 1,092 |
| | **Special Certification** | | | |
| | By the American Board of Otolaryngology | | | |
| | Endoscopy | | 2 | 2 |
| | By the American Board of Pathology | | | |
| | Pathologic Anatomy | | ** | ** |
| | Clinical Pathology | | | |
| | Pathologic Anatomy and Clinical Pathology | | | |
| | By the American Board of Psychiatry and Neurology | | | |
| | Psychiatry | | 1,770 | 2,143 |
| | Neurology | | 162 | 200 |
| | Psychiatry and Neurology | | 887 | 800 |
| | By the American Board of Radiology | | | |
| | Radiology | | ** | 287 |
| | Roentgenology | | | 56 |
| | Diagnostic Roentgenology | | | 56 |
| | Therapeutic Radiology | | | 4 |
| | Totals | | 2,921 | 3,649 |

* Included in totals for American Board of Surgery.
** Figures not available.

to each board and their officers is reproduced in the following pages.

A list of the approved specialty boards, the year of their activation and the number of certificates awarded prior to March 1, 1948, and the number certified to July 1, 1949, respectively, appear in table 24. Figures are also given in these two groups showing the numbers certified in the subspecialties and finally the available figures pertaining to special certification by the boards of otolaryngology, psychiatry and neurology, and radiology.

On March 1, 1948, there were 31,416 physicians certified by the sixteen boards in operation at that time; 4,472 physicians were certified from March 1, 1948 to July 1, 1949. Included in this figure are the 277 physicians certified by the American Board of Preventive Medicine since its activation early in 1949. The 174 Founder Member certificates issued by the Board of Thoracic Surgery are included in the figures for the American Board of Surgery. The first examination for certification in thoracic surgery was given on Aug. 1, 1949. The first examination of the American Board of Proctology will be given in November 1949. No certificates have as yet been issued by this board. Up to July 1, 1949, a total of 35,888 physicians had been certified by eighteen boards.

TABLE 25.—*Annual Specialty Board Certifications 1940-1949*

| Year (Ended March) | Number of Boards in Existence | Number Certified | Accumulated Totals |
|---|---|---|---|
| 1940 | 14 | ..... | 15,851 |
| 1941 | 15 | 2,085 | 17,936 |
| 1942 | 15 | 1,736 | 19,694 |
| 1943 | 15 | 2,172 | 21,866 |
| 1944 | 15 | 1,578 | 23,444 |
| 1945 | 15 | 1,308 | 24,752 |
| 1946 | 15 | 1,320 | 26,072 |
| 1947 | 15 | 2,424 | 28,496 |
| 1948 | 16 | 3,002 | 31,416 |
| 1949 (July 1) | 16* | 4,472 | 35,888 |

* One board, the American Board of Proctology, did not certify any candidates during this period.

On March 1, 1948, 982 certificates in subspecialties were awarded and an additional 100 by July 1, 1949, bringing the total in the subspecialties to 1,082.

Table 25 gives the annual number of specialists certified for the past ten years by all boards and the accumulated totals. The largest number (4,472) obtained certificates in the period from March 1, 1948 to July 1, 1949. The figures represent the total number of certificates issued and do not represent the number of living specialists.

The fourth edition of the "Directory of Medical Specialists" compiled by the Advisory Board for Medical Specialists, published in 1949, includes biographic data pertaining to the educational background of each of the living specialists, including those retired from practice, certified by an American Board.

The current list of residencies and fellowships in the specialties approved by the Council and acceptable to the American boards in fulfilment of their clinical training requirements was published in the May 14, 1949, issue of THE JOURNAL.[1] Additions to this list and a revised list of approved residencies in general surgery appear on pages 48 to 51 of this issue.

1. J. A. M. A. **140**: 173 (May 14) 1949.

## AMERICAN BOARD OF ANESTHESIOLOGY, INC.

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#### QUALIFICATIONS FOR ELIGIBILITY TO CERTIFICATION

A. *General.*—1. An applicant's moral and ethical standing in the profession must be satisfactory to the entire board. The board must be assured that the applicant is engaged in the practice of anesthesiology as a specialty and that he intends to continue to be so engaged.

2. Membership is required in the American Medical Association or membership in such other medical societies as are recognized for this purpose by the Council on Medical Education and Hospitals of the American Medical Association. Membership in other societies shall not be required.

3. Practice must have been limited to anesthesiology for five calendar years, of which at least two must have been devoted to special training.

4. In exceptional instances the board may, in its discretion, accept for examination candidates who have met all the preliminary requirements and have clearly demonstrated their identity as anesthetists over a period of years, but whose formal training does not comply with the full requirements.

B. *Professional Standing.*—1. An applicant must be a graduate of a medical school in the United States or Canada approved by the Council on Medical Education and Hospitals of the American Medical Association, or a diplomate of the National Board of Medical Examiners.

2. Satisfactory evidence must be supplied of completion of an internship of not less than one year in a hospital approved by the same Council, or its equivalent in the opinion of the board.

3. An applicant must establish in a manner satisfactory to the Board of Anesthesiology: that he is a physician duly licensed by law to practice medicine; that he is of high ethical and professional standing, and that he has received adequate training in anesthesiology.

C. *Special Training and Practice.*—1. Before certification the candidate must have had an active experience limited to anesthesiology of not less than five calendar years (including period of training).

2. The board requires the inclusion of at least two years of carefully supervised instruction in the clinical phases of anesthesiology in hospital clinics, dispensaries and diagnostic laboratories recognized by the Council on Medical Education and Hospitals of the American Medical Association as competent in the teaching and practice of anesthesiology. In addition, instruction in anatomy, physiology, pharmacology, biochemistry and other basic sciences which are necessary to the proper understanding of the problems involved in the specialty of anesthesiology is required.

#### EXAMINATIONS

The qualifying examination will be divided into Part I, written; Part II, oral, and Part III, practical.

### PART I

1. An applicant to be eligible for Part I must meet all supervised training requirements, and his credentials must be approved by the board.

2. Part I may be given simultaneously in several places, which the board may deem suitable for the purpose, on the third Friday of each January.[1]

### PART II

1. In order to be eligible for Part II, a candidate must have successfully passed Part I and must be a member of the American Medical Association.

2. Part II examinations will be held during the third week in October at a place announced in THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION. Later, however, as the demand grows, it may be necessary to establish additional dates when this part may be held.[2]

### PART III

1. The examiners will observe the work of the candidates in their own or similar operating room surroundings, their relations to other staff members, and investigate their professional standing.

*Conduct of Examination.*—Carefully conducted and thorough examinations will be required of candidates. The aim will be to avoid unduly exacting standards above present facilities for study and practice in anesthesiology and, on the other hand, to prevent laxity, which would nullify the main purpose of the certification. Thus the type of examination will depend on a careful review of the work done, years of practice, special courses of study and professional standing of the applicant.

Written examinations will cover such topics as anatomy, biochemistry, physiology, pharmacology, pathology, physical diagnosis, therapeutics and clinical practice in relation to anesthesiology.

Oral examinations will cover topics in the foregoing list, especially as to their clinical application.

Practical demonstrations will be required of the management of the candidate's clinical practice in his local surroundings. This may include inspection of clinical records, records of departmental activities, library facilities and available apparatus, and demonstrations of application of anesthetic agents, methods and technics included in anesthesiology.

*Grades.*—A candidate must receive a passing average for each part to be entitled to certification.

A candidate who fails in his examination in Parts I, II or III may be permitted reexamination at yearly intervals for two (2) consecutive examinations in that part without further payment of fee. The board may, however, for sufficient reason, deny a candidate the privilege of reexamination.

Applicants who fail to exercise the examination privilege within three (3) years of the date of becoming eligible for examination are required to file a new application and pay a new application fee.

*Fee.*—The fee shall be $100. At least $25 shall be paid on filing the application (of which sum $15 will be returned if the candidate is not accepted for examination) and the remainder shall be paid before taking the examinations.

This board is a nonprofit organization. All fees are to be used to extend the existing facilities for training in anesthesiology, after deducting necessary expenses for maintenance of the office and the conducting of examinations. The board reserves the right to increase the fee when found necessary.

*Additional Information.*—Every candidate applying for certification must personally appear before the board before being certified.

Application must be made on special blanks to be procured only on written request by the applicant from the secretary of the American Board of Anesthesiology. They must be completely and accurately filled out, accompanied by the other required credentials and filed with the secretary after one year of supervised instruction and at least three months prior to the date of examination.

The secretary cannot make any eligibility rulings. These are made only by the entire board on recommendation of the appropriate committees after reviewing the candidate's formal application. Applications cannot be considered for classification and action by these committees unless accompanied by an application fee of $25, $10 of which is not returnable.

1. If there are sufficient applicants written examinations may be held on the third Friday of July annually.

2. Oral examinations may be held during the third week of April annually.

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## AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY

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### REQUIREMENTS FOR ELIGIBILITY FOR EXAMINATION

#### I. GENERAL REQUIREMENTS

1. High ethical and professional standing.

2. Graduation from a medical school recognized by the Council on Medical Education and Hospitals of the American Medical Association. The credentials of graduates of foreign schools must be approved by the National Board of Medical Examiners.

3. Satisfactory completion of an internship of not less than one year in a hospital approved by the same Council, or its equivalent in the opinion of the board.

4. A license to practice medicine issued by endorsement of the certificate of the National Board of Medical Examiners or following examination.

5. Membership in the American Medical Association or membership in a similar society recognized as having the same purpose as the American Medical Association.

6. Citizenship in the United States or citizenship—meaning native citizens—in Canada or Cuba.

#### II. SPECIAL REQUIREMENTS

Applicants for certification of the Board are classed in two groups as follows:

Group A consists of physicians who have limited their practice mainly to dermatology and syphilology for ten or more years, including a period of training satisfactory to the Board. This classification was abolished Jan. 1, 1949.

Group B consists of physicians who have completed an approved three year period of training.

In accordance with the program recommended to the various specialty boards by the Advisory Board for Medical Specialties the following minimum requirements of special training for admission to examination have been established:

A period of study, after the internship, of not less than three years. This training may be obtained as resident, fellow or graduate student in clinics, dispensaries, hospitals or laboratories recognized by the Council on Medical Education and Hospitals of the American Medical Association and approved by the American Board of Dermatology and Syphilology as competent to provide a satisfactory training in dermatology and syphilology. This period of specialized training shall include:

(*a*) At least one calendar year in an institution approved for three year training (less one month for vacation).

(*b*) Graduate training in the basic medical sciences which are necessary for the proper understanding and treatment of the diseases involved in this specialty.

Instruction in the following fundamental subjects as related to the skin is deemed advisable by the board: embryology,

histology, chemistry, physiology, bacteriology, mycology, parasitology, pathology, immunology, serology, pharmacology and materia medica, and physics of physical therapy.

(*c*) Carefully supervised clinical and laboratory experience in the specialty.

(*d*) Annual examinations in the clinical, laboratory and public health aspects of dermatology and syphilology.

#### PRECEPTORSHIP TRAINING

Candidates may spend one year of their training in the office of a diplomate of the board, who has also been approved as a preceptor by the board. The office training may be divided over two years, with one-half day spent in the office of the preceptor and the other half day in an approved institution. Preceptorship training may be taken during any of the years of training. Time spent with an instructor who has not been approved by the board may count only as experience and not as training. A list of approved preceptors is available in the office of the secretary.

The board assumes the responsibility of determining the standards of knowledge to be acquired, but on the candidate rests the responsibility of acquiring the knowledge to fill these standards.

#### PRELIMINARY REGISTRATION, APPLICATION AND FEE

All students beginning their graduate training should file a preliminary registration form with the secretary.

In order that the committee on requirements may appraise carefully the qualifications of candidates, application must be made on a special blank, which may be obtained from the secretary. No application will be considered unless made on the regular application blank. Applications should be filed early in order to obtain full advantage of the sets of histopathologic slides which are available through the Army Medical Museum in Washington. The completed application blank should be sent, at least two months before the date of examination, to the secretary of the board together with the required reprints, photographs and a registration fee of $25, which will not be refunded under any circumstances. No application will be considered until this fee is received. An examination fee of $75 is payable when the candidate is notified that his application is acceptable to the board. The fee of $100 has been carefully computed and is used entirely for administrative purposes. Examiners for the board do not receive any compensation except for actual expenses connected with holding the examinations.

Make checks payable to American Board of Dermatology and Syphilology, Inc.

#### EXAMINATIONS

Applicants classified in Group B will be required to pass a written examination. This written examination on clinical, basic science and laboratory subjects will be held simultaneously at stated intervals in different parts of the country, approximately two months before the oral examination. Candidates must pass the written examination before being admitted to the oral examination.

Applicants classified either in Group A or in Group B will be required to pass an oral, clinical and laboratory examination. This examination will be conducted in a clinic or hospital ward, where individual cases will be discussed with each candidate, as well as various subjects related to the skin such as histopathology, mycology, allergy and physics of physical therapy. The board reserves the right to add to this list other subjects within the field of dermatology and syphilology.

A candidate for a certificate may take both the written and oral examinations at the next regular examination of the board after he has completed three full years of training in the specialty; this provision does not affect the regulations about the issuance of the certificate. (See Certificates.)

Examinations are designed to test the candidate's fitness to practice dermatology and syphilology as a specialty. The board will try especially to ascertain the breadth of his knowledge in the basic, as well as the clinical aspects of cutaneous medicine, to test his familiarity with the recent literature of dermatology and syphilology and to ascertain his general qualifications as a specialist in this branch of medicine.

Whenever an applicant fails to pass the examination, the board, if requested, will make suggestions as to suitable courses of instructions for the purpose of overcoming deficiencies in the applicant's knowledge of this specialty.

Except in special circumstances, applicants shall take the examination within the year following the filing of application and the deposit of the fee.

The oral examination may be held near the time and place of the annual meeting of the American Academy of Dermatology and Syphilology. This examination will be held only at the time of regular meetings of the Board.

#### REEXAMINATIONS

If the candidate fails or is conditioned in an examination he will be admitted to a second examination after one year, and must give sixty days' notice of his intention to appear for reexamination. If a candidate who has failed or has been conditioned does not appear for reexamination before the expiration of three years, he will be required to make a new application and pay an additional fee of $75 before reexamination.

A candidate who has failed twice must file a new application and pay an additional fee of $75.

#### CERTIFICATES

A certificate will not be issued until the candidate has completed at least five years of dermatologic training and experience. The granting of this certificate by the board indicates that the holder of the certificate has had adequate training in dermatology and syphilology and has successfully fulfilled the requirements of the board.

A certificate granted by this board does not of itself confer or purport to confer any degree or legal qualifications, privileges or license to practice dermatology or syphilology. The board does not intend to limit or interfere with the professional activity of any duly licensed physician. Its aim is to improve the standards of practice of dermatology and syphilology by encouraging improvement in the opportunities for and quality of training for specialists in this field of medicine, and to certify as specialists those who voluntarily comply with the requirements of the board.

Certificates will be issued only to physicians in the United States and its possessions, in Canada and in Cuba.

## AMERICAN BOARD OF INTERNAL MEDICINE

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#### REQUIREMENTS FOR ADMISSION TO EXAMINATION AND CERTIFICATION

Each applicant for certification by this board must satisfy the qualifications listed below: (I) General Qualifications A, B, C, D; (II) Professional Qualifications A, B, C, D. For exceptions to the requirements C and D under Professional Qualifications see paragraph G.

### I. General Qualifications

A. All candidates must be citizens of the United States or Canada.

B. All candidates must present evidence of satisfactory moral and ethical standing in the medical profession.

C. All candidates must be active members in good standing in their county and state medical societies in their state of legal residence. Under unusual and exceptional circumstances the board reserves the privilege of modifying this requirement. (This ruling shall not apply to commissioned officers of the United States regular Army or Navy or United States Public Health Service who are otherwise members of the American Medical Association.)

D. Canadian citizens must be active members of the Canadian Medical Association before admission to examination.

### II. Professional Qualifications

A. Graduation from a medical school approved by the Council on Medical Education and Hospitals of the American Medical Association at the date of graduation.

B. Satisfactory completion of an approved internship of not less than twelve months.[1]

C. Approved residency or fellowship training in internal medicine according to the following plan (Plan A) or one of the alternate plans described under paragraph D.

Plan A: A residency or fellowship in internal medicine for a period of not less than three years in a hospital or other institution approved by the Council on Medical Education and Hospitals of the American Medical Association for residency or fellowship in internal medicine. In addition, two years of practice of clinical internal medicine will be required. The board will accept the following equivalents as satisfying one year only of the three years of residency or fellowship to which this paragraph refers. (Two years must be in the field of general internal medicine.)

1. A second year (or a part thereof) of approved internship in a hospital approved for resident training in internal medicine if limited to the medical service (or medical specialties noted under *2*) and if recognized as being the equivalent of an assistant residency by the Medical Director of the hospital and the Chief of the Medical Service. Verification must accompany application.

2. One year of approved residency in one of the medical specialties: allergy, cardiovascular disease, gastroenterology, hematology, pulmonary diseases, neurology, pediatrics and psychiatry.

3. One year of approved residency in pathology.

4. One year as a graduate student or as an instructor in an approved medical school on a full time basis in bacteriology, biochemistry, pathology, pharmacology, physiology or internal medicine.

5. An advanced degree in the fundamental sciences.

NOTE.—Graduate training credit for the time involved will be allowed candidates who take and satisfactorily complete postgraduate courses in internal medicine or the basic medical sciences provided by accredited medical schools on a full time basis. This ruling shall not apply to courses of less than three months' or more than twelve months' duration. A certificate of creditable performance, based in part, at least, on a formal examination on completion of the course, will be required.

D. Alternate Training Plans: The board firmly believes that the plan of intensive training prescribed herein offers the best opportunity for a young physician to prepare himself to meet his responsibilities as a specialist in internal medicine. It is recognized, however, that capable individuals may accomplish the same result in a longer period of time during which the training is less intensive. The board realizes that a number of medical graduates cannot follow the shorter and more desirable plan either because suitable residencies are not available or, in some instances, because of personal and economic reasons. Accordingly the board has modified its previous regulations governing eligibility for admission to examination. In doing so the board has not modified its standards of examination. It has liberalized its eligibility requirements for admission to examination by accepting half time formal training and the practice of internal medicine under favorable circumstances as to professional and hospital contacts, in lieu of part of the full time requirements. It is hoped that by this means exceptional individuals may acquire a knowledge of medicine and experience in its application sufficient to qualify for examination.

The program already described (Plan A), which consists of three years of formal training in an approved residency or its equivalent, following internship, and two additional years in the practice of internal medicine, is recommended by the board. Variations in this program are now subject to the following regulations.

1. In all instances, one year of approved internship and one year of approved residency will be required, except as indicated under Plan G. The graduate training credit of one year heretofore granted as a result of active duty as a commissioned officer in the armed forces during the period beginning Dec. 7, 1941 and ending Jan. 1, 1947 may not be applied in satisfaction of the one year of approved residency referred to in Plan D, E or F unless the candidate's assignment is considered by the board to have been equivalent to an approved residency.

2. Following one year of internship and two years of approved residency,[2] the remaining requirements may be satisfied by: Plan B; that is, by two years of half time formal training followed by two years of practice limited to internal medicine, or by Plan C; that is, by five years of practice limited to internal medicine.

3. Following one year internship and one year of approved residency, the remaining requirements may be satisfied by:

Plan D[3]; that is, by four years of half time formal training followed by two years of practice limited to internal medicine; or by:

Plan E[3]; that is, by two years of half time formal training followed by five years of practice limited to internal medicine, or by:

Plan F; that is, by eight years of practice limited to internal medicine.

4. In every instance at least two years of practice in internal medicine must be included, but in instances in which four years of practice are substituted for one year of residency, only one additional year of practice will be required; when more than eight years of practice are substituted for two years of residency an additional year of practice will not be required.

5. Physicians who have practiced internal medicine for twelve years following an approved internship may qualify for the examinations without further training (Plan G).

Half time formal training under expanded plans B, D and E is defined as follows:

1. Half-time[3] as an instructor in clinical medicine in a recognized medical school in the United States or Canada.
2. Half-time[3] in a research fellowship sponsored by a recognized medical school in the United States or Canada.
3. Half-time[3] as a graduate student in an approved graduate medical school in the United States or Canada.

E. Practice Requirements: A period of not less than two years of practice in the general field of clinical internal medicine or in the more specialized branches of medicine. (See exceptions, paragraph 4.) This requirement may be satisfied by independent practice or in association with a recognized internist.

1. During the period in which the 9-9-9 program was in effect an approved internship of nine months will satisfy the requirement of twelve months. A residency of nine months is considered as nine months only.

2. For the second year of approved residency one of the equivalents described under C may be substituted.

3. Half time formal training is regarded as four hours per day for six days per week. It is required that half time formal training be verified by the head of the department. Verification must accompany application.

NOTE: Although in general the board believes it desirable to complete the three years of formal training before satisfying the requirements of practice, a reversal of this order is acceptable.

F. Graduates of Foreign Schools: At the present time neither the Council on Medical Education and Hospitals of the American Medical Association nor any other educational agency in the United States has the machinery to evaluate adequately the quality of foreign medical education. This board must, therefore, evaluate the fundamental educational credentials and other qualifications of each individual candidate educated abroad who applies for admission to examination. (Requirements for graduates of foreign schools may be obtained on request to the board—One West Main Street, Madison 3, Wis.).

G. Candidates Graduating Prior to 1937: The requirement of three years of graduate training will not apply to candidates graduating from approved medical schools in the United States and Canada in 1936 or previous thereto, provided such candidates have limited their work to the field of internal medicine for at least two years, and provided each candidate is recognized as an internist by his colleagues in his community.

H. "Preceptor Training": Preceptor type training is not recognized in satisfaction of any part of the three year requirement of formal graduate training.

I. The board will grant one year of graduate training credit, or one year in satisfaction of the requirements of practice, regardless of assignment, for active duty as a commissioned officer in the United States Army, Navy or United States Public Health Service for one year or more, beginning on or subsequent to Dec. 7, 1941 and terminating on or before Jan. 1, 1947. Commissioned officers serving less than one year prior to Jan. 1, 1947 may apply that interval as graduate training, or in partial satisfaction of the requirements of practice.

Service credit, either graduate training or practice, beyond one year requires individual evaluation by the Credentials Committee. If a candidate believes that his service prior to Jan. 1, 1947 merits more than one year of graduate training credit or practice credit he should request Form S-11. This application requires the full names and present addresses of former chiefs of service.

### PRINCIPLES OF TRAINING

The American Board of Internal Medicine is interested in the fact that the candidate has embarked on a career of study voluntarily and has thereby expressed the desire to excel and to participate personally in the world's progress in medicine.

Preparation must be based on years of continuous thoughtful study. Therefore, in suggesting a program for those who wish advice, the board hopes to assist the candidates to avoid inferior and superficial programs which may lead to failure and disappointment in later years.

The board believes that all internists should have a sound fundamental knowledge of anatomy, bacteriology, biochemistry, pathology, pharmacology and physiology. Such knowledge is essential to the continued progress of any internist. The board anticipates that adequate training will be obtained in the basic sciences as applied to internal medicine during a formal three year residency program.

The board wishes to emphasize that time and training are but a means to the end of acquiring a broad knowledge of internal medicine which the candidate must demonstrate to the board in order to justify it in certifying that he is competent to practice internal medicine as a specialty. The responsibility of acquiring the knowledge rests with the candidate. The responsibility of maintaining the standards of knowledge required for certification rests with the board.

### APPLICATION

Candidates for examination must make their application on a prescribed form, which may be obtained from the office of the Assistant Secretary-Treasurer.

The application must contain a record of the candidate's premedical and medical training as well as of internships, residencies, graduate study, hospital or dispensary staff appointments, teaching positions, service in the armed forces, membership in medical societies, medical papers published and the names of four well known internists to whom the board may write for professional and character reference.

The application must be accompanied by one recently signed photograph of the candidate mounted on the application, and the registration and examination fee of $40, which fee will cover both the written and oral examinations. An additional fee of $10 will be required when the certificate is issued.

The requirements of graduate training and two years of practice in the field of internal medicine must be satisfactory before a candidate is eligible to apply for admission.

### METHOD OF EXAMINATION—WRITTEN AND ORAL

The examinations for certification by the board comprise two parts: Part I is written; Part II is clinical and is an oral examination. The written examination is held simultaneously in different sections of the United States and Canada. Effective Jan. 1, 1949, one written examination will be given each year. This examination will be held on the third Monday in October. This examination is divided into a morning and afternoon period, for each of which three hours are allowed. The questions are of the multiple choice type, framed in such a manner as the board elects and designed to test the applicant's knowledge of applied physiology, anatomy, physiological chemistry, pathology, bacteriology and pharmacology as related to internal medicine, and his basic clinical acumen.

Candidates must pass the written examination before admission to the oral examination will be authorized. The oral examination is conducted under the direct supervision of the board. It is held near the time and place of the annual meetings of the American Medical Association and the American College of Physicians. The examination is conducted at the bedside of the patient. Each candidate is assigned two or more patients and is expected to be sufficiently familiar with whatever problems present themselves to satisfy the board of his clinical expertness.

Normally only two oral examinations are given each year. The board may, however, schedule special oral examinations if necessary. Announcement of all examinations will appear in the *Annals of Internal Medicine* and THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION. Applications cannot be accepted until the schedule is announced in the publication referred to.

### REEXAMINATION—WRITTEN AND ORAL

1. Effective July 1, 1949, the board will waive the restrictions on the number of written examinations authorized, provided the candidate has satisfied the requirements hereinafter set forth in paragraph 4. The board may at its discretion deny reexamination in individual cases. The interval between the first and second written examinations will be one year. The interval between all subsequent written examinataions will be two years. A longer period may be required by the board. A fee of $10.00 is required for each additional written examination.

2. Effective July 1, 1949, the board will waive restrictions on the number of oral examinations authorized, provided the candidate has satisfied the requirements hereinafter set forth in paragraph 4. The board may at its discretion deny reexamination in individual cases. The interval between the first and second oral examinations will be one year. The interval between the second and third oral examinations will be not less than two years. The interval between all subsequent oral examinations will not be less than three years. A longer period may be required by the board. A fee of $20.00 is required for each additional oral examination.

3. This ruling does not make it mandatory for a candidate to repeat the examination within the specified time limit. Candidates may elect a longer interval in the case of both the written and oral examinations.

4. When applying for reexamination, a candidate who has been unsuccessful in three written or three oral examinations will be required to present evidence that he has completed additional graduate training of at least three months in internal medicine in an approved medical school, on a full time basis, or its equivalent in approved resident or fellowship training since the last examination. In individual cases the board may require a longer course. Short courses of less than three months may not be applied in satisfaction of this requirement. A new application for admission is required.

The provisions of this section shall be effective retroactively. Any candidate previously disqualified from further examination on the basis of having been unsuccessful in three examinations, either written or oral, may now apply for reexamination subject to the provisions of paragraphs 1 through 4 of this section.

CANCELLATIONS

Effective July 1, 1949, any candidate who cancels his assignment for a written or an oral examination after the official cards of admission have been mailed, will be required to pay a special fee in the amount of $10.00 before a subsequent examination, unless his cancellation was due to a cause deemed adequate by the board to exempt him from such special fee. The mailing date of the cards of admission will be approximately one month previous to the date of examination. This provision becomes necessary because of the large number of cancellations after complete arrangements have been made, and the expense incident thereto.

CERTIFICATES

The certificate issued by the American Board of Internal Medicine shall be in such form as to comply with the articles of incorporation and the by-laws and shall be signed by the officers and members of the board and shall bear the official seal of the board.

Certificates of the board will be issued to candidates who have satisfactorily completed the written and oral examinations and have been found qualified by the board to practice the specialty of internal medicine. Specialty certification will be designated on the certificate, for those so certified.

SUBSPECIALTY BOARDS

Allergy, cardiovascular disease, gastroenterology and pulmonary diseases are recognized specialties.

Each subspecialty application is individually considered and acted on by the subspecialty board concerned. The candidate is not eligible for examination until his application has been approved by the subspecialty board concerned and confirmed by this board.

All candidates must pass the written and oral examinations in internal medicine before admission to examination in a specialty of medicine referred to. The specialty examinations are oral only and may be taken the day following the examination at any regularly scheduled oral examination subsequent to the candidate's certification in general medicine. Announcements of the oral examination will appear in THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION and the *Annals of Internal Medicine*.

Application forms will be forwarded on request to the office of the Assistant Secretary-Treasurer and should be returned to his office when completed.

## AMERICAN BOARD OF NEUROLOGICAL SURGERY, INC.

WINCHELL MCK. CRAIG, Chairman, Rochester, Minn.
JOSEPH P. EVANS, Vice Chairman, Cincinnati.
WILLIAM J. GERMAN, Secretary-Treasurer, 789 Howard Avenue, New Haven 4, Conn.
A. W. ADSON, Rochester, Minn.
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LEO M. DAVIDOFF, New York.
FRANCIS C. GRANT, Philadelphia.
HOWARD C. NAFFZIGER, San Francisco.
ERIC OLDBERG, Chicago.
BRONSON S. RAY, New York.
R. GLEN SPURLING, Louisville, Ky.
HARRY WILKINS, Oklahoma City.

Eligibility for Examination: To be eligible for examination and certification by the board, all candidates must possess the preliminary and basic medical qualifications required by the Advisory Board for Medical Specialties as applied to all specialties as follows:

A. GENERAL QUALIFICATIONS

1. Moral and ethical standing in the profession satisfactory to the Board of Directors.

2. Membership in the American Medical Association or, by courtesy, membership in such Canadian or other medical societies as are recognized for this purpose by the Council on Medical Education and Hospitals of the American Medical Association.

3. Those who limit their surgical activities to the practice of neurological surgery.

4. It shall be discretionary with the board to accept for examination candidates who have been in practice more than six years but whose formal training fails to meet the full requirements.

5. Properly qualified candidates who are permanent residents in and citizens of other countries and are legally qualified to practice medicine there, and who have received their training in neurological surgery in the United States of America or Canada may apply for certification by the American Board of Neurological Surgery.

B. PROFESSIONAL STANDING

1. Graduation from a medical school of the United States or Canada approved by the Council on Medical Education and Hospitals of the American Medical Association, or graduation from a foreign school which is acceptable to the American Board of Neurological Surgery, Inc.

2. Completion of a surgical internship of not less than one year in a hospital approved by the same Council, or its equivalent in the opinion of the Board.

C. SPECIAL TRAINING

A period of graduate study in a recognized graduate school of medicine of not less than three years beyond the intern year, or in an approved hospital or under a sponsorship acceptable to the American Board of Neurological Surgery, Inc., for the training of neurological surgeons.

This period of special training shall be of such a character that the relation of the basic sciences of anatomy, physiology, pathology, bacteriology and biochemistry is emphasized. Knowledge of these sciences as applied to practice of neurological surgery will be required in the examination.

An additional period of not less than two years in the practice of neurological surgery.

APPLICATIONS

An application on the official application blank in such form as may be adopted from time to time by the Board of Directors, in order to be considered at any meeting, must be in the hands of the secretary-treasurer of the board not less than sixty days before the date of such meeting.

The secretary-treasurer of the board on receipt of an application shall forthwith make inquiries from those to whom the candidate refers and from such other persons as the secretary-treasurer may deem desirable, after which he shall forward the application to the Committee on Credentials. This committee shall consider the application and other information available and notify the secretary-treasurer its recommendation whether or not the applicant is acceptable. The certification of a candidate shall be approved by a majority of the members of the entire board at any meeting held for such certification

PAYMENT OF FEES

The fee for certification, with or without examination, shall be seventy-five dollars ($75).

The candidate for examination on filing his application shall accompany it with an application fee of twenty-five dollars ($25). When notified by the secretary-treasurer that he is eligible for examination he shall send the examination fee of fifty dollars ($50) to the Secretary-Treasurer at least two weeks before the date of the examination. The application fee will be returned if the candidate is not accepted for examination.

REEXAMINATION

A candidate who has failed in one examination is eligible to reexamination in the subject, or subjects, in which he failed, within three years, on payment of a reexamination fee of ten dollars ($10). A candidate who has failed in one examination and who does not apply for reexamination within three years or a person who has applied within that time but who has failed a second time will be considered a new applicant.

## AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY

WALTER T. DANNREUTHER, President, New York.
JOSEPH L. BAER, Vice President, Chicago.
WILLARD R. COOKE, Vice President, Galveston, Texas.
PAUL TITUS, Secretary-Treasurer, 1015 Highland Building, Pittsburgh 6.
ROBERT L. FAULKNER, Assistant Secretary, Cleveland.
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ROBERT A. KIMBROUGH JR., Philadelphia.
LAWRENCE M. RANDALL, Rochester, Minn.

### PREREQUISITES TO ELIGIBILITY

Each applicant before he may become eligible to receive the certificate of the board or other evidence of recognition:

1. Must have had conferred on him a degree in medicine by an institution of learning approved by the Advisory Board for Medical Specialties and the Council on Medical Education and Hospitals of the American Medical Association.

2. Must establish in a manner satisfactory to the Board of Directors that he is a physician duly licensed to practice medicine, and

(*a*) that he is of high ethical and professional standing.

(*b*) that he has received adequate training in both obstetrics and gynecology as a specialty. Training in one branch only is not acceptable. The term "adequate training" as used here shall be construed as meaning at least six months and preferably a year full time, in the branch of either obstetrics or gynecology relegated to a minor role in a candidate's training and preference for practice.

3. Must make application for investigation of his credentials and a survey of his character.

4. Must assure the board that he is limiting his practice to obstetrics and/or gynecology and that he intends to continue to do so, except for military duties, having limited for at least six months before making application. Effective Dec. 31, 1949, candidates will not be accepted who have not been in practice limited to the specialty for a minimum period of at least two years following completion of their specialty training.

5. Must have membership in the American Medical Association or membership in such Canadian or other medical societies as are recognized for this purpose by the Council on Medical Education and Hospitals of the American Medical Association.

This board will not accept applicants for examination who are not full citizens of the United States or of Canada, though they be residents of either country. Foreign born applicants must have been certified by either the National Board of Medical Examiners or licensed to practice medicine in the United States or Canada by a state or provincial board of licensure. Notarized statements, not original citizenship papers, must be furnished when the application is filed attesting to the fact of full citizenship in the United States or Canada, if the applicant is foreign born. Further, there will be required a probationary period of at least three years from the date of licensure in the practice of medicine in these countries before such a candidate may be admitted to examination.

The board has ruled that physicians who accept male patients in their private or other practice, for operative or other care, cannot be regarded as specialists in obstetrics and gynecology, except by special ruling when this is related to active military duty.

This board deprecates engagement in fields of practice other than that in which candidates profess to be specialists. The board does not exclude from examination, however, obstetricians-gynecologists who practice abdominal surgery and urology in the female, as well as breast surgery, because of the correlation of these activities.

Military service or any other similar patriotic service, such as work with Selective Service boards, have not been construed as nonlimitation of practice in violation of the board regulations.

### REQUIREMENTS

The requirements for all candidates will be uniform as follows:

1. Completion of at least one year intern service in a hospital approved by the Council on Medical Education and Hospitals of the American Medical Association. This need not be a general rotating internship, although this latter is preferred.

The board accepts the fifth or "intern" medical school year required at some schools in lieu of the usual fifth or intern "clinical training" year following graduation.

A second year general internship is to be considered as one of a candidate's years of practice. No credit will be given toward special training during a second year general internship.

2. A minimum of seven years of practice after the intern year, including at least three years of residency training in approved institutions, or adequate preceptorship training and including at least six months' post-training practice limited to the specialty. Effective Dec. 31, 1949, this latter requirement shall be increased to two years, at least, of post-training practice limited to the specialty. Post-training practice period may include full time medical school or other positions within the specialty, actual practice within the specialty as an assistant associate, or independently. Details regarding allowances for time in practice when the applicant offers a preceptorship as part or all of his training must be decided individually for each case by the Credentials Committee.

3. The period of special training should emphasize the relation of the basic sciences, anatomy, pathology, physiology, biochemistry and bacteriology, to the application of surgical principles which are fundamental in all branches of surgery. In addition, the candidate must understand and be trained in the following subjects: viz., the care of emergencies, shock, hemorrhage, blood replacement, electrolyte and fluid balance, protein and nitrogen balance, choice of anesthetics, chemotherapy, acidosis and alkalosis, narcotics and hypnotics and wound healing.

4. No formal graduate courses are required. If taken, credit will be limited to six months.

### PRECEPTORSHIPS

As a substitute for special residency training, service with a qualified obstetrician-gynecologist preceptor, preferably one who has been certified by the board, may be acceptable. The exact time basis for this has not been specified, and each case must be reviewed and decided individually by the Credentials Committee after the application is submitted in the regular manner. The time allowance for this type of training will vary with the amount of work done with the preceptor. It is unusual for more than six months' credit to be given for one year of preceptorship training.

An acceptable preceptor is a specialist in obstetrics and gynecology of long experience, preferably certified by this board. His volume of office and hospital practice must be large enough to offer ample opportunity for the candidate's training. Preceptor training should include participation in procedures of office and hospital practice, including operative and obstetric responsibilities, with adequate time devoted to the studies of basic sciences and pathology and the study of current literature pertaining to this specialty. The preceptor should supervise closely the candidate's work and keep an informative record of the candidate's performance in order to facilitate the board's efforts in evaluating the adequacy of the candidate's training.

### APPLICATION AND FEES

Application must be made on a special blank which will be furnished by the secretary's office, 1015 Highland Building, Pittsburgh 6, Pa., and must be forwarded with the other required credentials and the application fee to the secretary's office at least ninety days prior to the scheduled date of the Part I examinations.

Candidates who have not had a minimum of three years formal residency type of special training should utilize Preceptorship or Supplemental Training forms, obtainable from this office to submit in addition to the regular application form.

The application fee is $25 and is not returnable.

The examination fee is $100 and is payable when the candidate is notified of acceptance for examination. This fee is not returnable after the candidate has been officially accepted by the Credentials Committee and notified to report for examination.

The fees have been carefully computed on a basis of cost of examinations and are used entirely for administrative expenses. Examiners and associate examiners serve as such without compensation other than actual expenses.

Applicants declared ineligible for admission to examination may request reopening of their applications within two years of the filing date without payment of an additional application fee. A request for the reopening of an application declared ineligible by reason of insufficient training, nonlimitation of practice or similar items may not be approved in less than two years, although application may be made as specified above to avoid payment of an additional fee. This approval time may be reduced under exceptional circumstances. The request must have adequate supporting evidence of additional training and experience to warrant reconsideration. Preceptorship or Supplemental Training blanks should be used for such reports, and these will be supplied on request.

After two ineligibility or postponement rulings on any candidate's application, an entirely new application must be submitted (with or without fee, according to current requirements) in order to bring data up to date. The essential feature of this should be evidence of additional training and experience.

Applicants declared eligible but who fail to exercise the examination privilege within three years of the date of filing the application are required to file a new and current application and to pay a new application fee.

An applicant entering military service during any national emergency and assigned to work in general surgery under conditions acceptable to the Credentials Committee may receive credit up to a maximum of six months applicable toward his three required years of specialty training. He should specifically request such credit in making his application. The additional time may be applied toward the years of practice requirement.

An applicant serving under military orders in an Army or a Navy hospital in an obstetrical and/or gynecological service under supervision will be given the same credit as if he were working under a preceptor, if these departments are supervised by diplomates of this board or recognized obstetricians-gynecologists. He may obtain full residency credit if such hospital is officially approved and listed for residency training in this specialty.

Additional time in military service with any type of general medical assignment may be applied toward the board's years of practice requirement. The Credentials Committee of the board will review and give consideration to each individual case.

Candidates should offer as sponsors or references two diplomates of this board with whom they are presently in contact, rather than men under whom they served as residents only. It is required that sponsors be from the candidate's community and currently acquainted with the candidate and his ability in his practice of the specialty.

On notice of acceptance for admission to examination, examination fee is due and also case records which should be shipped by the candidate to the secretary's office as soon as possible and not later than the date of the Part I written examination.

The candidate should make immediate acknowledgment of his notice of acceptance, at which time he will notify the secretary's office approximately when to expect his case reports.

### EXAMINATIONS

Part I examinations are scheduled annually for the first Friday in February. Grades cannot usually be mailed from the secretary's office until after the following April 1. Arrangements will be made for candidates to report in any convenient city where there may be a diplomate of this board to conduct or supervise the written examination which will be sent out from the board's office under sealed cover.

Special arrangement will be made through senior officers for conducting the written portion of the Part I examination for men in military service. Such candidates are requested to keep the secretary's office informed at all times of changes in their mailing addresses.

All applicants accepted for examination will be required to obtain a passing grade in both the written examination and a review of case reports (Part I), before becoming eligible for the oral-clinical and pathology examinations (Part II). The passing grade for the written examination and case reports is 75 per cent. A candidate whose grade in either or both falls below 75 per cent is conditioned.

Reexamination for the removal of conditions in Part I may be taken after one year but within three years after the first failure, without payment of an additional fee.

Candidates who successfully complete the Part I examination proceed automatically to the Part II examination held later in the year.

Candidates appearing for reexamination under a new application after two previous failures will not be required, if they have passed all or part of the Part I examinations on their first application, to repeat such examination items already successfully cleared.

#### PART I

Examination consists of:

1. A comprehensive written examination, conducted annually, including questions on both obstetrics and gynecology and related basic sciences. The written examination will be limited to a maximum period of three hours.

2. The filing, not later than the date of the written examination, of twenty-five obstetrical and gynecological case reports, in condensed form. Five cases may concern major illnesses, not necessarily operative. All must be of patients for whom the candidate was personally responsible. Grades on case reports submitted for review prior to the written examination will be announced simultaneously with those of the latter; candidates who take the written examination but fail to submit case reports on or before the date of the written examination cannot be given the grade on the latter until their case reports have been received and graded.

#### PART II

The oral-clinical and pathology examinations given all candidates are conducted by the entire board and the associate examiners usually near the time and place of the annual meeting of one or more of the national societies represented on this board. Advance announcements of examination dates and place will be made in medical journals throughout the country.

Examination consists of:

1. Oral examination before two to four examiners.

An endeavor is made to adapt the details of the oral examination to each candidate's experience and practice. The examination is particularly directed to ascertain his familiarity with recent obstetrical and gynecological literature, the related basic sciences, the breadth of his clinical experience, and his general qualifications as a specialist in obstetrics and gynecology.

2. Pathology examination.

The candidate is expected to identify and to discuss several obstetrical and gynecological pathologic specimens and sections.

Examiners report orally on each candidate to the assembled board, after which the results of their investigations are considered jointly by the entire board and associate examiners. After a general consideration of the details of the candidate's oral and pathology examinations, including a review of his capability and general adaptability, the candidate is passed or failed by the entire board.

The final action of the board is based on the candidate's ethical and professional record, training and attainments, as well as on the results of his formal examination.

No conditions are given in Part II of the examination. When a candidate fails in Part II of the examination, he is not required to repeat Part I but to take a reexamination in the oral-clinical and pathology portions only. One reexamination may be taken within three years of the original examination and first failure without formal reapplication papers. Request

for reopening of the candidate's original application must be filed with a reexamination fee of $25. Data regarding additional training or experience acquired in the interim must also be provided on a Supplemental or Preceptorship Training Form obtained from the office of the secretary of the board.

The reexamination fee will be effective only on original applications filed subsequent to the date of this announcement, namely, June 1, 1949.

The candidate may reappear at the examination following the one failed by him. The board may, at its discretion, deny the candidate the privilege of reexamination.

Failure to exercise the privilege of reexamination within three years entails the filing of a new application with the usual application and examination fees.

After two failures in either Part I or Part II on the first application, the candidate may reapply and be readmitted to examinations once only. Exceptions to this ruling can be made only by action of the entire board in annual session, usually to be based on evidence of additional training and experience sufficient to warrant such action.

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Address all communications to the American Board of Ophthalmology, Cape Cottage, Maine.

### REQUIREMENTS

All candidates must comply with current board regulations regardless of time of filing application.

The secretary is not permitted to make decisions as to requirements. These rulings are made only by the Committee on Credentials after reviewing the candidate's formal application.

### PREREQUISITES

1. High ethical and professional standing.
2. Full citizenship in the country where the candidate practices. (Limited to countries of North and South America, their possessions and territories.)
3. A degree from a medical school of high standing, satisfactory to the board and approved by the Council on Medical Education and Hospitals of the American Medical Association. An applicant whose training has been received outside of the United States and Canada must present credentials satisfactory to the board and is required to have the certificate of the National Board of Medical Examiners if he has been in practice less than ten years.
4. Completion of an internship of not less than one year in a hospital approved by the same Council.
5. Not less than thirty-six months (a total of sixty months is required of candidates practicing both ophthalmology and otolaryngology) of combined study, training and practice of ophthalmology in approved medical schools, hospitals, clinics, dispensaries, laboratories, preceptorships and private practice.

### GENERAL REQUIREMENTS FOR ALL CANDIDATES

1. Application forms must be filled out completely and accurately. Letters of endorsement, together with any other required credentials, must be sent to the secretary's office before the deadline date.
2. Fee of $100 remitted with application.
3. A list of papers or books published.
4. Written qualifying test.
5. Practical examination.
6. Special review of ophthalmic surgery.
7. Membership in the American Medical Association, or such other societies as are recognized for the purpose by the Council on Medical Education and Hospitals of the American Medical Association.

### FEES

For written test and original examination, $100 (as mentioned previously).

Repeating Written Qualifying Test, $65.

Repeating Practical Examination, $65.

Single conditions, Written or Practical (except surgery), $35.

Repeating Practical Surgery, $35. Two or more conditions, $35.

Written qualifying test must be taken within three years of date of application. Thereafter new application and fee are required.

The fees have been carefully computed on a basis of cost of examinations and are used entirely for administrative expenses. Examiners serve without compensation other than actual expenses.

### SPECIAL TRAINING

(Applicable so far as practicable after 1948)

This shall include:

1. Graduate study of the basic medical sciences which are fundamental to the intelligent practice of ophthalmology, particularly: anatomy, histology, embryology, optics, physiologic optics, visual physiology and psychology, pathology, bacteriology, pharmacology, disorders of ocular motility and binocular vision, perimetry, and in the skilful adjustment and use of instruments such as the ophthalmoscope, retinoscope, slit lamp and microscope. Mere factual knowledge is not sufficient; the candidate must have had training in the application of these subjects and in their use in clinical ophthalmology, especially in refraction.
2. Active clinical experience in approved hospitals, clinics, dispensaries and private practice. Library and laboratory facilities should be utilized for intensive study of cases.

The subject matter to be covered under 1 and 2 is outlined in the syllabus prepared by the board.

These requirements may be met in various ways:

### BASIC STUDIES

Anatomy
Embryology and developmental abnormalities
Biochemistry
Pathology
Bacteriology and immunology
Optics and physiological optics
Ocular physiology
Relation of eye to general diseases
Therapeutics and pharmacology
Neuro-ophthalmology

These may be covered by:

A. *Graduate Study.* — By a curricular course in the basic sciences related to ophthalmology in an approved graduate medical school.

B. *Postgraduate Study.* — By courses in individual basic sciences related to ophthalmology as given at various approved institutions. The Home Study Course of the American Academy of Ophthalmology and Otolaryngology is recommended.

C. *Residency.*—By advanced study of these subjects during a residency and by correlation of the principles involved with clinical problems.

D. *Research, Fundamental and Clinical.* — By the detailed study, under supervision or as assistant to an experienced research worker, of some problem or topic which brings the basic sciences into direct relation with the concrete clinical problem.

### CLINICAL EXPERIENCE

A. By residency in an approved hospital. The most desirable of these residencies have regular lectures covering the entire field of clinical ophthalmology and of the basic subjects as applied in clinical practice. Many of these have seminars at

which residents report cases which they have carefully worked up. These are discussed by the other residents and by the staff and the method of presentation as well as the subject matter critically considered.

B. By residencies in hospitals where regular instruction by lectures and quizzes and seminars is not available. The syllabus issued by the board will guide the resident in his selection of topics to be studied.

C. By fellowships in ophthalmology.

D. By preceptorship with a well-trained and critical ophthalmologist.

E. After completing a residency it is of great advantage to secure a position in a clinic as fellow or assistant. This may require only part time work, but due credit will be given. Its value to the student depends on how much study he puts into it and on how competent his seniors are.

F. Research under competent critical and sympathetic supervision will give first hand insight into (1) the methods whereby old knowledge was and new knowledge is acquired and (2) the pitfalls which accompany attempts to enlarge the sphere of knowledge. Only in this way can the candidate evaluate basic facts in the intelligent critical way which is expected of the specialist in practice.

G. The candidate who cannot secure the type of residency he desires should not despair, for his progress depends far more on how he uses his opportunities than on the opportunities themselves.

#### WRITTEN QUALIFYING TEST

Before being accepted for examination, candidates are given a written test to ascertain their qualifications. The questions may cover any part of ophthalmology and are especially devoted to the basic studies as listed above. The written test will be given in several principal cities at the same time. Choice of cities is determined largely by the geographical distribution of candidates. Candidates found acceptable will be notified to appear for a subsequent practical and clinical examination in ophthalmology.

#### EXAMINATIONS

Examinations will be held annually at or near the time and place of the meeting of the American Medical Association; also at other times and places at the discretion of the board, depending on the number of applications from any region.

The board reserves the right to limit the number of candidates to be admitted to any one examination.

Candidates must be examined in all subjects listed in the sections titled Basic Studies and Practical and Clinical Examination. The time spent in preparation will count less than the knowledge and experience acquired as shown on examination.

#### PRACTICAL AND CLINICAL EXAMINATION

The subjects of the practical examination are as follows: (1) External Diseases, (2) Ophthalmoscopy, (3) Histopathology, (4) Refraction, (5) Motility, (6) Ophthalmic Surgery, (7) Perimetry.

1. *External Diseases of the Eye and Adnexa.* — Various methods of examination, diagnoses and treatment.

2. *Ophthalmoscopy.*—Patient will be examined by the candidate and the findings described or drawn. A candidate is required to bring his own ophthalmoscope.

3. *Pathology.* — The candidate will demonstrate familiarity with general clinical pathology as well as the etiology, pathology and bacteriology of diseases of the eye. He will be asked to examine microscopic slides and to recognize normal and pathologic histology of the eye.

4. *Refraction.*—A candidate will examine patients and show mastery of various methods, and of the principles of refraction and of retinoscopy. He should bring his own retinoscope.

5. *Motility.*—The candidate will demonstrate upon patients his familiarity with routine methods of examination and diagnosis.

6. *Ophthalmic Surgery.* — A candidate will demonstrate his surgical technic upon animal eyes. He must bring his own equipment for performing an extracapsular combined extraction of the lens.

7. *Perimetry.*—The candidate will be given an opportunity to examine patients by use of the arc perimeter, the tangent screen and the stereocampimeter. He may also be required to interpret charted fields.

#### SPECIAL REVIEW OF SURGICAL CASES

The board now requires of all candidates a list of ophthalmic operations performed within two years prior to examination. This list is to be presented with application.

The operations should be listed in groups of each type of surgery. The numbers of operations in each group must be totalled and the total number of all operations shown. This list must contain the following data:

1. Date.
2. Condition or conditions for which operation was performed.
3. Name and character of operation.
4. Identification by hospital or clinic number, or the name of a consultant or confrere who was present at the time of operation.

Circumstances which prevent any candidate from fulfilling this requirement should be fully explained, with detailed statement of candidate's surgical experience.

#### REEXAMINATION

Candidates may be reexamined as often as they desire on satisfactory evidence of adequate additional preparation and payment of reexamination fee. A minimum of one year must elapse between examinations when a candidate is conditioned in one or more subjects. A minimum of two years additional preparation is required of candidates who fail in all subjects. The board may, at its discretion, deny the candidate the privilege of reexamination.

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#### QUALIFICATIONS OF CANDIDATES

There are certain general qualifications applicable to all candidates for examination Part I and Part II. In addition, candidates must have had special training in orthopedic surgery on one of the approved plans hereinafter described:

#### GENERAL QUALIFICATIONS

(*a*) He must be a citizen of the United States or Canada.

(*b*) He must be a graduate of a medical school approved by the Council on Medical Education and Hospitals of the American Medical Association. In the case of an applicant whose training has been received outside the United States or Canada, his credentials must be satisfactory to the Council on Medical Education and Hospitals of the American Medical Association and to the National Board of Medical Examiners; he must have engaged in the practice of orthopedic surgery in the United States or Canada for at least three years prior to submission of his application.

(*c*) He must have served an internship in a general hospital acceptable to this board. Beginning in 1951 and thereafter, applicants for Part I of the examinations must have had a year of resident training in surgery in addition to their internship.

(*d*) He must be duly authorized to practice medicine in the state or province of his residence.

(*e*) He must be ethical and have good professional standing.

(*f*) He must be a member of the American or Canadian Medical Association before he can be declared as eligible for Part II of the examinations.

#### SPECIAL QUALIFICATIONS

The trainee should realize that preparation for the specialty of orthopedic surgery should include a sound knowledge of anatomy, pathology, physiology, bacteriology and biochemistry, as these basic sciences apply to orthopedic surgery. In addition,

he should have observation and first hand experience in the diagnosis, treatment, operative and postoperative care of recent and old fractures and other orthopedic problems of adults and children. However, when so desired, the trainee may substitute additional experience in fractures and adult orthopedics for the work in children's orthopedics as outlined in subsequent paragraphs.

Many hospital services approved for orthopedic training have all phases represented in such proportion that they can be given concurrently over a three year period and provide a well balanced program. Such a plan of training is probably the most desirable. However, it is possible for one to obtain satisfactory training by taking various phases of the work in different institutions (matched training). In order to help the trainee plan a well balanced program of matched training the board suggests that it be arranged as follows: adult orthopedics, one year or one third of the training period; fractures, six months or one sixth; basic sciences, six months or one sixth, and children's orthopedics, one year or one third (as previously indicated a second year of fractures and adult orthopedics may be substituted for the year of children's orthopedics).

The clinical phases of training may be obtained in hospitals or under preceptors where adequate facilities are not available for instruction in the basic sciences. In such cases the trainee should spend at least six months in the graduate department of a medical school which can offer adequate facilities and instruction in these subjects.

On completion of a year of internship and a year of resident training in surgery (the latter requirement being applicable to those who apply for Part I of the examinations in 1951 and thereafter), the trainee may take his special work in orthopedic surgery by one of three plans: (1) resident training on an orthopedic service of a hospital approved by the Council on Medical Education and Hospitals; (2) combined resident training and assistantship. (3) preceptorship.

1. *Resident Orthopedic Training.*—The applicant should serve for three years as a resident in orthopedic surgery on services approved by the Council on Medical Education and Hospitals. When taken as matched training, each of the required phases should be taken on a service approved for that particular phase and all phases must be covered. If the trainee elects to substitute additional adult orthopedics and fractures for a year of children's orthopedics, the training that is substituted must be acquired on an approved orthopedic service and the total period of resident training must be three years. The type of credit available in various institutions is indicated by the symbols "A," "C," "F" and "S" in the lists of approved residencies published by the Council on Medical Education and Hospitals.

2. *Combined Resident Training and Assistantship.*—In special instances, with the prior approval of the Committee on Resident Training, the board will recognize for not over two years of training in orthopedic surgery periods of training in which the candidate combines work as resident on a hospital service, with part time assistantship to an orthopedic surgeon certified by the American Board of Orthopedic Surgery, provided that the major part of his time is spent by the candidate in the hospital service.

3. *Preceptorship.*—In certain instances, the board may recognize training under the preceptorship plan. Before taking training under a preceptor, the applicant must have completed an internship and a year of resident training in surgery. The preceptor must be a diplomate of the board whose clientele is large enough to give the trainee experience in all phases of orthopedic work. The trainee will be required to serve as full time assistant for five years, and during this period the preceptor should devote special periods of time each week, outside of the routine hours employed in the hospital and office practice, to assist the trainee with organized courses of study similar to those covered during resident training. If facilities and instruction in the related basic sciences are not available, the trainee should spend at least six months of this five year period as a student in a recognized graduate medical school where these subjects can be provided. Upon completion of the five years under a preceptor, the trainee should engage in practice, limited to orthopedic surgery, either alone or associated with a diplomate, for a further period of five years, before becoming eligible for Part II of the examinations.

### Practice Requirements

No applicant can be admitted to examination on practice alone, without meeting the prescribed training through approved residencies, mixed training or preceptorship.

These requirements are intended not only to test the applicant's determination to practice in an ethical manner and limit his practice to the special field of orthopedic surgery, but also his ability to increase his scientific knowledge. Prior to making application for Part II, applicants who took training as residents on approved orthopedic services should have had at least two years of experience in practice limited to the field of orthopedic surgery. Applicants who had preceptorship training, must have had five years of practice limited to the specialty. Applicants who did not take children's orthopedics, but substituted adult orthopedics and fractures instead, must have limited their practice to the same field in which they were trained.

### Credit for Service with the Armed Forces

Because in some instances applicants who served with the armed forces acquired good training in orthopedic surgery, credits up to a maximum of two years may be allowed. Such credit, however, may be granted only on presentation of evidence that such service is, in the opinion of the Committee on Eligibility, equivalent to similar periods of approved resident training. Those requesting credits for training acquired while in the service should submit their completed Record of Professional Assignments with their application.

(*a*) A year of orthopedic experience with the armed forces, when approved by the committee, may be accepted to replace one of the three required years of orthopedic training.

(*b*) A second year of orthopedic service with the armed forces may be credited as a year toward the practice requirement.

(*c*) Credit for military service will be considered for assignments covered between January 1941 and July 1946.

## EXAMINATIONS

### Application for Examination

Applications for examinations, Part I and Part II, shall be filed with the secretary on the prescribed forms and shall be accompanied by the prescribed fees which the board may fix from time to time. The required data shall be entered in typewritten form and the application must be accompanied by an unmounted autographed recent photograph of the applicant. The names of two diplomates of the board shall be supplied by the candidate for reference.

The completed application must be filed with the secretary at least sixty days prior to date set for examination.

The data submitted in each application must be checked and verified in the offices of the American Medical Association.

Letters of reference shall be obtained by the secretary from diplomates whose names have been submitted by the applicant. Additional information may be sought from other available sources.

If an application has been approved, the candidate will be notified by the secretary and should then forward the required fee for the examination, Part I or Part II, as the case may be.

### Examinations

Applicants for certification will be required to take the examination of the Board in two parts. No applicant shall be permitted to take both parts of the examination at the same time, nor can he be permitted to take Part II until he has successfully passed Part I. These may be held in different places and on different dates to meet the needs and convenience of candidates and board members. Announcement of the time and place for examination will be made through the medical journals.

### Examination, Part I

(*a*) *Eligibility for Examination, Part I.*—Beginning in the year 1952 the minimum requirement for eligibility for examination, Part I, shall consist of completion of an internship; a year

of resident training in general surgery and two years of resident training in orthopedic surgery on an approved service.

Applicants filing in 1951 for Part I examination to be given in 1952 are subject to these minimum requirements.

Applicants who have completed more than this minimum requirement are eligible for Part I at any time up to completion of their full requirements; however, candidates who are fully qualified must submit application for Part I and successfully pass this examination before submitting application for Part II.

Candidates who make application based on preceptorship training will be considered by the Committee on Eligibility on completion of an internship and a year of resident training in surgery, followed by five years as a full time assistant under a preceptor who is a diplomate of the board.

(*b*) *Examination, Part I.*—This part shall consist of a written examination and oral interviews covering those parts of anatomy, pathology, physiology and biochemistry related to surgery and orthopedics. In addition there will be questions on fundamental surgical principles, elementary fractures and orthopedic procedures, history taking and physical examination.

### Examination, Part II

(*a*) *Eligibility for Examination, Part II.*—Candidates applying for examination, Part II, must have successfully passed Part I and must have completed the prescribed training and practice periods, as defined in Special Qualifications. A candidate who does not appear for examination Part II within ten years after passing examination Part I will be required to again take and pass examination Part I before admission to examination Part II.

A separate application for Part II must be completed and forwarded to the secretary, together with the required application fee, at the specified time.

(*b*) *Examination, Part II.*—This part of the examination will be given in only one city once each year. It will consist of oral quizzes and a written examination covering the advanced work in all phases of orthopedic surgery. The oral examinations will include an interview in anatomy, pathology, fractures, congenital and acquired deformities, static and postural defects and other orthopedic subjects.

(*c*) Applicants who have qualified with a year of children's orthopedics will have separate written and oral questions related to this phase of orthopedic surgery.

In certain instances, on recommendation of the Committee on Eligibility a representative of the board may be requested to make a visit of inspection to review the applicant's work in his own community. In other instances, the committee may require the candidate to submit copies of complete records of twenty-five major surgical cases and abstracts of an additional twenty-five cases.

### Reexamination

An applicant who fails to pass Part I or Part II of the examinations may be reexamined a second and third time in each part by paying the prescribed examination fee each time he is reexamined. Additional application fees are not required for reexamination. The applicant who fails must appear for his second or third reexamination within three years after the first failure. After three years a new application with the appropriate fee must be submitted.

After three successive failures in Part I or Part II of the examinations the applicant must have had additional graduate training in orthopedic surgery before submitting a new application.

### Times and Places for Examination

Part I of the examination will be given probably during May of each year in various centers that will be designated by the board. The secretary will give applicants advance notice of the date, place and hour.

Part II of the examination will be given in one place and probably not oftener than once each year. As a rule it will be in connection with the meeting of the American Academy of Orthopedic Surgeons and will precede the meeting.

## AMERICAN BOARD OF OTOLARYNGOLOGY

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### Requirements

The following qualifications of candidates for examination are required by the Board:

1. A candidate acceptable for the examination (1) must have been a citizen of the United States (or Dominion of Canada) for at least three years; (2) must have been a graduate for four years or more (five years after 1950) of a medical school approved by the Council on Medical Education and Hospitals of the American Medical Association; (3) must have had at least one year's general internship in a hospital approved by the American Medical Association or other nationally recognized organization; (4) must be of good moral character and ethical in his professional relations. Graduates of foreign medical schools should have passed the examination of the National Board of Medical Examiners. Candidates who have become naturalized citizens must give proof of their medical education and graduate training. Candidates from foreign countries must be permanent residents and citizens thereof and meet the general requirements above.

2. A candidate must be a member of the American Medical Association, the Canadian Medical Association, or other medical societies of equal standing recognized by the Council on Medical Education and Hospitals of the American Medical Association.

3. Each candidate must have had acceptable training and be competent in the applied basic sciences fundamental to the intelligent practice of otolaryngology. Anatomy of the ear, nose, throat, neck, chest, esophagus and nervous systems, pathology, bacteriology, physiology, didactic otolaryngology and fundamentals of surgery are required. These requirements may be fulfilled in residency training or in an organized postgraduate course.

4. Effective Until 1950—a candidate must have completed two years' residency in otolaryngology or three years' residency in ophthalmo-otolaryngology and have restricted his practice to otolaryngology (or ophthalmo-otolaryngology) for a minimum of three years or four years, which may include the period of training.

5. Effective Until 1950—five years' practice limited to otolaryngology (or ophthalmo-otolaryngology) may be accepted in lieu of the requirements in section 4, if the training has been under guidance or preceptorship which meets the approval of the Credentials Committee of the Board.

6. Effective After July 1, 1950—candidates must have completed a course of three years' study in otolaryngology, or four years' study if ophthalmology is included (in which case there must be a minimum of 50 per cent spent in the study of otolaryngology). The three years may have been spent in a residency which includes study of the basic sciences as specified in section 3, approved by the Board and the Council on Medical Education and Hospitals of the American Medical Association, or the candidate may have completed an organized course in the basic sciences and approved training in a residency which would give a total of three years' study in the specialty. A year's residency in surgery or medicine, or a two years' rotating internship, may be accepted as the equivalent of one year's training in otolaryngology. In addition to the foregoing, the candidate must have had a minimum of one year in practice limited to the specialty.

7. Effective After July 1, 1950—a candidate, in addition to the requirements in sections 1, 2 and 3, may qualify for examination if he has limited his practice to otolaryngology (or ophthalmo-otolaryngology) for six years under the supervision and direction of practitioners in the specialty approved by the board, in association with a hospital staff approved by the Council on Medical Education and Hospitals of the American Medical Association.

8. Candidates who cannot meet all the listed requirements may be accepted for examination in exceptional circumstances, but only on the recommendations of the board.

9. A limited certificate in one of the subspecialties of otolaryngology may be issued at the discretion of the board to an exceptionally well qualified individual in the special field in which the certificate is desired.

All candidates must comply with current board regulations, regardless of the time of filing application.

APPLICATION AND FEES

1. Application must be made in duplicate on special blanks procured from the secretary. The completed application blanks must be returned to the secretary, together with the other required credentials, at least one hundred and twenty days in advance of the examination at which the candidate desires to appear.

2. The applications must be accompanied by two small photographs of the candidate, together with verification of the period of enrolment from the institutions where training in otolaryngology was obtained, and the names of two or more otolaryngologists, preferably diplomates of the board, from the vicinity of the candidate's place of residency, to be used as references.

3. The fee for the examination is $100, no part of which is returnable. Of this sum $25 must accompany the application. No application will be acted on until the $25 application fee is received. The balance of the fee—$75—must be paid to the secretary on notification that the candidate has been accepted for examination and at least ninety days in advance of the date of examination. A reexamination fee of $50 is required of candidates conditioned in one or more subjects.

4. The fees have been carefully computed on a basis of cost of examinations and are used entirely for administrative expenses. Examiners serve without compensation other than actual expense.

5. The application remains valid for three years. An applicant must appear for examination within this time or forfeit the fee.

6. Candidates whose credentials have been found satisfactory and who meet the requirements of the board will be notified ninety days prior to the date of examination. The number of candidates who can be admitted to any one examination is limited. Because of the large number of applications on file, delay in assignment for examination may be inevitable. Appointments will be given in the order applications are accepted.

7. The board, acting as a committee of the whole, reserves the right to reject an applicant for any reason deemed advisable and without stating the same, and the action of the board shall be final.

EXAMINATION

Examination will be held at such time and place as the judgment of the board may dictate. Advance notice of examinations will be given in The Journal of the American Medical Association and the several special journals devoted to otolaryngology. So far as is possible these will be held twice a year at, or near, the time and place of meeting of the American Medical Association, or special societies, and of the American Academy of Ophthalmology and Otolaryngology. The examinations cover from two to four days.

*Scope.*—This examination encompasses all phases of otolaryngology and peroral endoscopy, including faciomaxillary surgery, and surgery of the neck, excluding the thyroid.

The type of examination is as follows:

1. Clinical, covering the actual handling of patients, including history taking, physical and functional examinations, the use of laboratory and roentgen findings and a discussion of differential diagnosis.

2. Didactic, oral examinations covering all phases of otolaryngology.

3. Gross and microscopic pathology.

4. A written examination may be included when the board deems this advisable.

REEXAMINATION

A candidate who is conditioned in examination may be admitted to a subsequent examination after one year and within the three year period dating from his application, on payment of an additional fee of $50 and one hundred and twenty days' notice of intention to appear is required.

Candidates who have failed in the examination may be accepted for reexamination on recommendations of the credentials committee. Satisfactory evidence of further study and progress will be required. A new application must be filed. The fee for reexamination for such candidates is $100, $25 of which must accompany the application. The balance of the fee, $75, will be due on notification of acceptance.

CERTIFICATION

1. A certificate granted by the board does not of itself confer or purport to confer any degree or legal qualifications, privileges or license to practice otolaryngology, nor does the board intend or attempt in any way to interfere with or limit the professional rights and activities of any duly licensed physician. Its aim is to improve the standards of practice of otolaryngology and to certify as specialists those who voluntarily comply with its requirements and regulations.

2. The final action of the board is based on the candidate's ethical and professional record, training and attainments, as well as on the results of his formal examinations.

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## AMERICAN BOARD OF PATHOLOGY

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A. General Requirements

1. Satisfactory moral and ethical standing in the profession.

2. License to practice medicine or a certificate of the National Board of Medical Examiners.

3. Membership or associate membership in the American Medical Association or membership in a national society accept-

able to the board by citizens of the United States. (At present, these include American Association of Pathologists and Bacteriologists, American Society of Clinical Pathologists, American Medical Association, or American Society for Experimental Pathology.) For citizens of other countries, membership in a national medical society of that country is required.

4. The applicant must devote his time primarily and principally to the practice of pathology.

### B. Professional Education

1. Graduation from a medical school in the United States approved by the Council on Medical Education and Hospitals of the American Medical Association, or graduation from a medical school in other countries acceptable to the board.

### C. Special Training and Experience

1. The board admits candidates to examinations who are otherwise eligible and who have had either of two following types of training and experience.

a. After five years, if four of the five years have been in institutions approved by the Council on Medical Education and Hospitals of the American Medical Association or by the board; or

b. After eleven years if none of the training and experience has been in institutions so approved.

2. The specific requirements for those acceptable after five years are as follows:

a. Pathologic anatomy only.

(1) Four years of supervised study and training in an institution approved for residency training in pathologic anatomy by the Council on Medical Education and Hospitals of the American Medical Association or by the board. It is immaterial whether the candidate holds the title of resident or fellow or assistant. Candidates may, at their own election, substitute not to exceed twelve months of a straight or rotating clinical internship or a fellowship or instructorship in any of the preclinical departments of a university for one of the four years. In addition, time, not to exceed twelve months, spent in a department of pathology of an approved school of medicine after the completion of the second year of undergraduate study may be counted for full credit toward the four years.

(2) One additional year which may be a continuation of the preceding or may be independent practice of pathologic anatomy in a hospital approved by the American Medical Association or other institutions acceptable to the board.

b. Clinical pathology only.

(1) Four years of supervised study and training in an institution approved for residency training in clinical pathology by the Council on Medical Education and Hospitals of the American Medical Association or by the board. It is immaterial whether the candidate holds the title of resident or fellow or assistant. Candidates may, at their own election, substitute not to exceed twelve months of a straight or rotating clinical internship or a fellowship or instructorship in any of the preclinical departments of a university, for one of the four years. Candidates, holding also a master's or doctorate degree in a special field of clinical pathology (bacteriology, serology, chemistry, parasitology or hematology) may obtain time credit for not more than twelve to twenty-four months toward the four years for this work regardless of whether it was taken before or after the medical degree. The evaluation of time credit will depend on how much of the broad field of clinical pathology was covered in the graduate work.

(2) One additional year which may be a continuation of the preceding or may be independent practice of clinical pathology in a hospital approved by the American Medical Association or other institutions acceptable to the board.

c. Pathologic anatomy and clinical pathology.

(1) Four years of supervised study and training divided as follows:

(*a*) Two years of supervised study and training in pathologic anatomy as outlined in the preceding paragraph C-2-a-(1).

(*b*) Two years of supervised study and training in clinical pathology as outlined in the preceding paragraph C-2-b-(1). Candidates declared eligible before July 1, 1952 may at their own election substitute one year (twelve months) of a straight or rotating clinical internship for one year of this special training in clinical pathology. After July 1, 1952, all candidates applying for both pathologic anatomy and clinical pathology will be required to have two years of supervised training in clinical pathology.

(2) One additional year which may be a continuation of the preceding or may be independent practice of both pathologic anatomy and clinical pathology in a hospital approved by the American Medical Association or other institutions acceptable to the board. After July 1, 1952, candidates who elect to claim credit of one year for a clinical internship must take this fifth year as supervised study and training in clinical pathology in institutions approved for residency training in clinical pathology by the Council on Medical Education and Hospitals of the American Medical Association or by the board. Candidates declared eligible after July 1, 1952, who do not take a clinical internship, may, after four years of training as outlined in C-2-c-(1)-(*a*) and (*b*), spend the fifth year in independent practice in an institution or laboratory acceptable to the board.

*Note.*—As outlined in the preceding paragraphs, the total time requirements of the board are unchanged after July 1, 1952, namely, five years of study or practice after graduation from medical school (with exceptions noted in sections C-2-a-(1) and C-2-b-(1).

3. The specific requirements for those acceptable after eleven years are as follows:

a. The practice of pathology under circumstances acceptable to the board for a period of not less than eleven years. At the election of the candidates, not to exceed one year of straight or rotating clinical internship may be subsituted for one of the eleven years. For those candidates in this category who have had some special study and training in pathologic anatomy or clinical pathology acceptable under paragraphs C-2-a, b or c, double time credit will be allowed. Thus, if a person has two years of acceptable supervised study and training, only seven years of practice are required.

### D. Special Qualifications

1. Prior to Dec. 31, 1947, the board at its discretion certified candidates without examination, if the following conditions were met as of July 1, 1939:

a. That the candidate has been for a period of five years of professional rank in a department of pathology in an approved medical school; or

b. That the candidate had been practicing pathology for ten years in a senior position in a hospital having an adequate department of pathology, and approved by the Council on Medical Education and Hospitals of the American Medical Association or in an institution acceptable to the board.

#### Credit for Military Service

Credit may be allowed for training and experience in pathology in the federal services during the period July 1, 1940 to June 30, 1947. This credit for training or experience or both is given on an individual basis and will depend on the opportunity the applicant has had as indicated by his or her medical service record in the specialty of pathology.

After July 1, 1947, credit for those military services will be given on the same basis as it is in civilian institutions, except that the rule in the preceding paragraph will not apply to reserve officers who continue on active duty or are called to active duty after that date.

#### Subspecialties of Pathology

(In force after July 1, 1948)

Candidates who have met all general requirements and who have successfully passed the examination in pathologic anatomy and clinical pathology may apply for special designation of a subspecialty of pathologic anatomy or clinical pathology. The board, at its discretion, may approve this application and, after the candidate has successfully passed a prescribed examination, will issue a certificate designating the subspecialty, reading "Pathologic Anatomy (Neuropathology)," "Clinical Pathology (Clinical Bacteriology)," etc.

Candidates who have met all general requirements and who have had five years of special training and experience in a special field of pathology which is acceptable to the board may apply

to the board for certification in this special field. The board, at its discretion, may approve this application, and after the candidate has successfully passed a prescribed examination, will issue a certificate reading "Neuropathology," "Clinical Bacteriology," etc.

APPLICATION BLANK AND FEE

Application must be made on the special form which may be procured from the secretary and forwarded with other required credentials and the application fee. An application cannot be given consideration by the board unless it is accompanied by the application fee.

The application or examination fee for candidates is $50. If the candidate fails in his examination he will be admitted to a second examination after one year, but not later than three years, without additional fee. After two reexaminations, the applicant must file a new application and pay an additional fee before a fourth examination will be given.

The application fee of $50 has been determined after careful consideration and is based on actual estimates of the expenses of examination and administration. None of the board members receive any compensation for their services except actual expenses incurred.

If the applicant, for any reason, is deemed ineligible for examination by the Board, his fee will be returned; however, the application fee is not returnable after the candidate has officially been accepted for examination and notified to report for the examination.

EXAMINATIONS

Written and oral examinations will be held at the discretion of the board at or near the time and place of national medical meetings. If a number of applications from any region of the country are received, an examination in conjunction with a national medical meeting in that section will be arranged so that the financial outlay of the applicant in meeting the examiners will be as small as possible.

The examinations are to be based on the broad principles of pathology with emphasis on diagnosis, interpretation and technic. The applicant may apply for certification in either pathologic anatomy or clinical pathology or both.

The examinations in pathologic anatomy consist of a written test, an oral examination on gross pathology and a practical examination in miscroscopic pathology. The examination in clinical pathology consists of a written test and an oral and practical examination in the six phases of clinical pathology: bacteriology, hematology, clinical chemistry, parasitology, serology and clinical microscopy.

DEFINITIONS

1. Pathologic anatomy is that branch of pathology which deals with the morphologic aspects of disease, recognition being given that that definition covers two phases of pathology.

(*a*) The applied phase with special attention to the description and diagnosis of gross and microscopic specimens.

(*b*) The academic phases of teaching and general morphologic diagnosis.

2. Clinical pathology is that branch of pathology which deals with bacteriology, immunology, clinical chemistry, parasitology, hematology, endocrinology and clinical microscopy, the application of the physical and biologic sciences to the diagnosis, prognosis and treatment of disease.

## AMERICAN BOARD OF PEDIATRICS, INC.

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JOHN MCK. MITCHELL, Executive Secretary, 6 Cushman Road, Rosemont, Pa.

APPLICANTS FOR CERTIFICATES

*Requirements for Applicants.**—All candidates for examination for certification must meet the following requirements:

1. Graduate from a Class A medical school.

2. One year of rotating or one year of pediatric internship in an approved hospital.

3. Two years of specialized residency-type training in an approved pediatric center.

On May 1, 1946, it was ruled that at least one year of the two years of required residency training must be a full time pediatric residency or internship in an approved institution. Because of the shortage of residencies, the board at this time voted that "temporarily" the second year of required residency training might be met in various ways listed below, although the board recommends that whenever possible candidates complete the two years as regular residents.

(*a*) A full time academic postgraduate course of nine months in an approved pediatric center is credited for one year's work.

(*b*) Shorter postgraduate courses of three to four months duration must add up to a full year.

(*c*) A maximum of three months' credit each is allowed for full time residency type training in allied pediatric subjects, such as pediatric allergy, pediatric psychiatry, pediatric pathology, pediatric cardiology and newborn service.

(*d*) A maximum of six months' credit is allowed for residency training in an approved contagious disease hospital.

4. A subsequent term of two years of specialized study or practice or a combination of the two. Credit for one year toward this requirement is allowed for military service.

Attention is invited to the fact that the primary duty of the resident must be the care of patients under supervision, if full credit in satisfaction of the residency training requirement is expected. Research residencies which involve little or no clinical training are creditable for only three months. Research residencies which include significant clinical training may be prorated to a total of six months for a year of service. Teaching fellowships may not be offered in lieu of residency appointments. Both research residencies and teaching fellowships are, of course, entirely acceptable in satisfaction of the practice or further study requirement. Portions of a research residency not applicable for residency training credit may be carried over for practice credit.

5. Preceptorships are not accepted for credit toward the residency requirement, but are accepted toward the practice requirement.

The board defines service in a pediatric center as full time devoted to rounded experience in an approved hospital which includes ward and outpatient service, experience with newborn, including prematures, and both therapeutic and preventive pediatrics. It is expected, also, that the service will include adequate graduate training in the basic medical sciences, as well as in the clinical laboratory and public health aspects of the specialty. The time served in pediatric centers need not be continuous or spent in the same institution.

A list of hospitals approved for training in pediatrics by the Council on Medical Education and Hospitals of the American Medical Association and by the American Board of Pediatrics will be found in the Internship and Residency Number of THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (**140**:203-205 [May 14] 1949).

The application fee is $125. This is used entirely for administrative expenses.

The full fee must be remitted with the application. Refund will be made only if the applicant is refused an examination. Applicants who failed an examination may apply for a second examination after two years have elapsed and the candidates have presented evidence of continued study and activity in pediatrics. The fee for a second examination is $75.

Application must be made on special blanks which may be secured from the executive secretary. These should be sent to the executive secretary well in advance of the date on which the candidate expects to be examined. At date of publication, lists are filling approximately one year ahead. No application

*The board advises all future candidates to communicate with the office of the executive secretary before entering on training to avoid misunderstandings.

will be accepted more than a year in advance of eligibility date.

Letters from two competent pediatricians recommending each applicant must be sent to the executive secretary of the board. These letters should not accompany the application, but should be sent directly to the executive secretary. No member of the board, or official examiner, may recommend any applicant.

A list of papers or books published must be sent in with the application blanks.

EXAMINATIONS

Examinations will be held at or near the time and place of meetings of the American Academy of Pediatrics, or at other times and places at the discretion of the board, depending on the number of applicants from any region of the country. It is proposed to arrange examinations in different cities so that as little financial burden as possible will be placed on the applicants in meeting the examiners.

The purpose of these examinations is to determine the applicant's competency to practice pediatrics. This board feels that the best impression of an applicant's ability can be obtained by oral examination, although written ones are frequently given. At present the board is giving a written examination six weeks preceding the oral examination. The written examination is given locally under a monitor. It is not proposed at the present time to require the applicant to send in case reports. The board feels that the clinical and abstract aspects of growth and development are fundamental parts of pediatric training.

INFORMATION ON CERTIFICATION IN ALLERGY
BY
THE AMERICAN BOARD OF PEDIATRICS

The American Board of Pediatrics, Inc., has established certification in allergy as a subspecialty of pediatrics.

Certification in pediatrics by the American Board of Pediatrics is a prerequisite for certification in allergy. Those who already hold certificates of the American Board of Pediatrics and who wish to be certified in allergy must make formal application to the executive secretary of the American Board of Pediatrics. Those who are not yet certified in pediatrics and who desire certification in allergy as well should indicate this in their application to the board of pediatrics as examination in both subjects may be held at the same time.

The application fee for certification in allergy will be $25 in addition to the application fee for pediatric certification.

An Advisory Committee of Allergy has been appointed to act with the Board of Pediatrics in all matters pertaining to the selection and examination of applicants for subspecialty certification. This committee is identical with the Advisory Committee on Allergy of the American Board of Internal Medicine.

The present members of the committee are:

HARRY L. ALEXANDER, St. Louis.
ROBERT A. COOKE, Chairman, 60 East 58th St., New York.
LESLIE N. GAY, Baltimore.
W. C. SPAIN, New York.
FRANCIS M. RACKEMANN, Boston.
OSCAR M. SCHLOSS, 125 E. 72nd St., New York, (pediatric representative).

The Advisory Committee on Allergy has outlined the requirements for applicants who desire examinations in the subspecialty of allergy as follows:

1. Two years, full time, in a satisfactory allergy clinic and its hospital (including training, in both allergy and pediatrics), or

2. One year, full time, in the allergy clinic and its hospital, and two additional years of full attendance on such an allergy clinic and its activities, or

3. Five years, full attendance, on such an allergy clinic and its activities, or

4. Special training under qualified preceptors, solely or in combination with aforementioned types of training, and such other training as might be felt adequate to prepare an individual for the practice of allergy.

It is further the opinion of the committee that clinics for such training should fulfil the following qualifications:

1. They should be in hospitals that have been accepted by the Council on Medical Education and Hospitals of the American Medical Association and by the American Board of Pediatrics for training and certification in pediatrics and for residencies in pediatrics or medicine.

2. The director of the Allergy Clinic shall be a diplomate certified in allergy by the American Board of Internal Medicine, or the American Board of Pediatrics.

When accepted the diplomate will receive from the American Board of Pediatrics a certificate in allergy and will be listed as a specialist in allergy.

Prospective applicants for certification in the subspecialty of allergy may apply to the executive secretary of the American Board of Pediatrics.

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## AMERICAN BOARD OF PHYSICAL MEDICINE AND REHABILITATION

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A. B. C. KNUDSON, Washington, D. C.
RICHARD KOVACS, New York.
WILLIAM H. SCHMIDT, Philadelphia.
ARTHUR L. WATKINS, Boston.

QUALIFICATIONS FOR ELIGIBILITY TO CERTIFICATION

Each applicant for admission to the examination shall be required to present evidence that he has met the following standards:

GENERAL QUALIFICATIONS

A. Satisfactory moral and ethical standing in the profession.

B. Membership in the American Medical Association or membership in such Canadian or other medical societies as are recognized for this purpose by the Council on Medical Education and Hospitals of the American Medical Association. (Exceptions to the foregoing qualifications shall be made by the American Board of Physical Medicine and Rehabilitation for good and sufficient reasons.)

PROFESSIONAL QUALIFICATIONS

A. Graduation from a medical school recognized by the Council on Medical Education and Hospitals of the American Medical Association.

B. Completion of an internship, preferably of the general rotating type, of not less than one year in a hospital approved by the same council.

SPECIAL TRAINING

A. A period of study after the internship of not less than three years in clinics, dispensaries, hospitals or laboratories recognized by the same council and by the American Board of Physical Medicine and Rehabilitation as competent to provide a satisfactory training in physical medicine.

B. This period of specialized preparation shall include: (*a*) graduate training in anatomy (including kinesiology and functional anatomy), physics (including radiation physics, electronics and medical instrumentation), physiology, pathology and other basic sciences which are necessary to the proper understanding of physical medicine; (*b*) an active experience of not less than two years in hospitals, clinics, dispensaries and diagnostic laboratories recognized by the Council and the American Board of Physical Medicine and Rehabilitation; (*c*) the written and oral examinations, given by the American Board of Physical Medicine and Rehabilitation, shall include questions concerning the basic sciences, clinical practice and laboratory and public health problems as related to physical medicine.

C. An additional period of not less than two years of study and/or practice in physical medicine.

METHOD OF EXAMINATION

Physical medicine includes the diagnosis and treatment of disease by means of physical agents. These physical agents

include heat, water, electricity, ultraviolet and infra-red radiation and mechanical devices and agents (such as massage and therapeutic exercise).

Physical medicine has been termed medical applied biophysics. As now practiced, the special field of physical medicine includes (1) the employment of physical agents in diagnosis (as in electrical tests for reaction of degeneration or in the cold pressor test), (2) the employment of physical agents in treatment, (3) occupational therapy and (4) the physical rehabilitation of convalescent and disabled patients.

The physician who specializes in physical medicine must have a thorough knowledge of the basic sciences as related to these subjects as well as clinical practice in the various phases of physical medicine.

Written and oral examinations will be given which will assure the board that the applicant is thoroughly grounded in:

A. The basic sciences including:

(*a*) Anatomy (including kinesiology and functional anatomy). Because of the importance of proper knowledge of the function of muscles in conjunction with the administration of therapeutic exercise and physical reconditioning of convalescent and disabled patients, the applicant will be carefully examined concerning his knowledge in this field.

(*b*) Physics (including radiation physics, electronics and instrumentation). Because physical medicine deals largely with the employment of physical agents, in diagnosis and treatment, the applicant will be expected to be well informed concerning the fundamentals of medical physics. He will be expected to be familiar with such subjects as the physics of heat, ultraviolet and infra-red radiation, and electricity (including the physics of low voltage currents and high frequency currents as employed in medicine). Because of the newer developments in medical electronics and medical instrumentation, the applicant will be examined concerning these subjects.

(*c*) Physiology. The applicant will need to know the fundamentals of physiology, especially the physiology of movement and the physiologic effects of the various physical agents employed in medicine.

(*d*) Pathology. A basic knowledge of pathology as related to physical medicine will be required and questions dealing with this subject will be included in the examination.

(*e*) Other fundamental sciences. The applicant will be examined concerning his knowledge of such subjects as biochemistry and bacteriology as related to physical medicine.

B. The clinical aspects of physical medicine including:

(*a*) Thermotherapy. The various clinical applications of heat and cold both locally and generally should be thoroughly familiar to the applicant.

(*b*) Hydrotherapy. The methods of employing hydrotherapeutic devices and procedures will be covered in the examination.

(*c*) Electrotherapy. Questions concerning clinical, diagnostic and therapeutic uses of the constant current, interrupted currents, sinusoidal and high frequency currents will be included in the examination.

(*d*) Radiation therapy. The applicant will be examined especially concerning the diagnostic and therapeutic uses of ultraviolet and infra-red radiation. (Applicants will not be required to answer questions concerning the therapeutic applications of roentgen rays and radium which are not included in the field of physical medicine but in the field of radiology.)

(*e*) Kinesitherapy. Questions concerning the clinical uses of therapeutic exercise and massage will be included in the examination.

(*f*) Occupational therapy. The applicant will be expected to answer questions concerning the indications for, and clinical applications of, various types of occupational therapy.

(*g*) Physical rehabilitation. Because of the importance of the understanding of the philosophy of convalescent reconditioning and rehabilitation of the seriously disabled person, the applicant will be expected to have a thorough knowledge of the modern developments in these phases of physical medicine.

#### APPLICATION

The application form shall contain a record of the candidate's premedical and medical training as well as of internships, graduate study, hospital or dispensary staff appointments, teaching positions, membership in medical societies, medical papers published, and the names of three well known physicians to whom the board may write for professional and character references.

The application shall also be accompanied by one recent, signed photograph of the candidate mounted on the application and the registration and examination fee of twenty-five dollars which fee will cover both the written and oral examinations. (In case of rejection of application, this fee will be refunded with the exception of $10, which will be considered as a registration fee.) An additional fee of $50 will be required when the certificate is issued.

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## AMERICAN BOARD OF PLASTIC SURGERY, INC.

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ESTELLE E. HILLERICK, Clerical Secretary, 4647 Pershing Ave., St. Louis 8.

#### GENERAL ELIGIBILITY REQUIREMENTS

1. Moral and ethical standing in the profession satisfactory to the board. The board, believing that the practice of "fee splitting" is pernicious, leading as it does to a traffic in human life, will reserve the right to inquire particularly into any candidate's practice in regard to this question.

2. Membership in the American Medical Association, or, by courtesy, membership in such Canadian or other medical societies as are recognized for this purpose by the Council on Medical Education and Hospitals of the American Medical Association.

3. Those whose activities are limited to the practice of plastic surgery.

4. This board will accept as applicants for examination only those who are full citizens of the United States or Canada. Notarized statements, not original citizenship papers, attesting to the fact of full citizenship in the United States or Canada must be furnished by foreign born applicants when the application is filed. Such candidates must have at least two years of practice in plastic surgery in North America after completing the training required by the board.

#### PROFESSIONAL REQUIREMENTS FOR QUALIFICATION

1. Graduation from a medical school of the United States or Canada recognized by the Council on Medical Education and Hospitals of the American Medical Association, or graduation from a foreign school considered acceptable by this board.

2. Completion of an internship of not less than one year in a hospital approved by the same Council, or what would constitute in the opinion of the board the equivalent of such training.

3. Two years of postgraduate work in general surgery beyond the intern year, as a resident or an assistant resident in an approved hospital, or a period of training gained elsewhere judged by the board to be the equivalent.

4. Training in general plastic surgery in an acceptable residency or preceptorship for an additional period of not less than two years, also to be taken in an approved hospital, or under auspices satisfactory to this board.

5. An additional period of not less than two years of practice in plastic surgery.

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6. After Jan. 1, 1953, certification by the American Board of Surgery shall be a prerequisite for eligibility for examination by the American Board of Plastic Surgery.

The aforementioned training may be taken as a resident in surgery and in plastic surgery in an acceptable hospital,[1] or under a sponsorship accredited by the American Board of Plastic Surgery for such training. By the latter statement it is meant that one may secure the necessary and specified training as an assistant to an accredited surgeon, provided suitable facilities for the education of the candidate are offered.

The period of special training should emphasize the relation of the basic sciences—anatomy, pathology, physiology, biochemistry and bacteriology—to the application of surgical principles which are fundamental in all branches of surgery. In addition, the candidate must understand and be trained in the following subjects: viz., the care of emergencies, shock, hemorrhage, blood replacement, electrolyte and fluid balance, protein and nitrogen balance, choice of anesthetics, chemotherapy, acidosis and alkalosis, narcotics and hypnotics and wound healing.

Because of vagaries of training, such as changes from one specialty to another, interims of military duty and other service to the country, the aptitude and skill of candidates, the board may, at its discretion, review and make recommendations for or against certification of certain applicants outside of the listed qualifications and requirements.

The board reserves the privilege of requesting lists of operations done solely by the candidate for one or more years, or of requesting special and extra examinations, written, oral or practical, and of requesting any specific data concerning the candidate that may be deemed advisable before making final decision for certification.

Eligibility rulings or an evaluation of a candidate's qualifications cannot be made by the secretary or by any one member of the board. These are made only by the Committee on Credentials and Requirements after a review of the candidate's formal application for such rulings, and approved by the board where necessary.

### TRAINING FACILITIES

Neither the board nor its individual members can be responsible for the placing of applicants for training, but it should be noted by the applicants that accredited work will be considered that which is done on a plastic surgery service approved by the board.

The American Board of Plastic Surgery, in cooperation with the Council on Medical Education and Hospitals of the American Medical Association and the American College of Surgeons, evaluates training facilities in institutions providing acceptable residencies in plastic surgery.

### MILITARY CREDIT

Credit for military service is given on an individual basis, each case being considered on its own merits and the amount of credit given being determined by the board when the information is submitted with the application.

### CASE REPORTS

Candidates whose general eligibility and professional requirements are found satisfactory shall be required to submit thirty-five diversified case reports, together with photographs, to the secretary of the board. This group of case reports must include a variety of material from the entire body rather than a number of cases of one type, and should carry the candidate's personal deductions, conclusions and comments and should be sufficiently detailed to show if the conclusions drawn indicate a grasp of the subject and if the results justify the procedure.

Each case report should be typewritten on paper approximately 8½ by 11 inches, separately numbered and paged, with the candidate's name on each page. Each report should be individually assembled and held by removable fasteners and should have a cover sheet with the candidate's name, the number of the case, hospital number, diagnosis and a brief summary of the case (not over 100 lines). The case reports, photographs and other data are to be filed with the permanent records of the board. Cases should be chosen from the private practice of the candidate or from the hospital or clinic service. Identification numbers of cases presented are required. The initials, color, age and occupation of each patient should be stated as should the name of the hospital where treated and dates of admission, operation and discharge. The important details of family history, if relevant, and of the previous history should be given. The history of the condition for which the candidate was consulted should be stated clearly and concisely, indicating previous treatment, if any, and the mental, social or economic factors involved. The physical examination of the patient with special reference to the existing deformities should be carefully described. All laboratory and other special examinations, such as roentgenograms, which were made, should be reported, with a statement of what was determined by them. The indications for operation and for the type of operation employed should be given; the preliminary treatment and the type of anesthesia used should be stated. A full description of the operative technic with methods of hemostasis, suture and drainage, if any, and the name of the assistant should be given. The early and late postoperative course and results should be described.

Photographs of conditions and drawings of operative technic, illustrative of each case, should be included and securely attached to each case report, with the name of the candidate and the number of the case indicated. All photographs should be made by a sharp focus lens from untouched negatives with identical lighting conditions, exposure and developing, and should show conditions before and after operations with clear detail.

If the case reports (and lists of operations when requested) are approved, the candidate will receive subsequent information regarding taking the examinations.

The board at its discretion may request certification of case reports by the hospital where the operations were performed. The following form should accompany the case reports: "I hereby certify that the planning and essential surgical procedures described herein were carried out by me as an independent operator."

A candidate must remember that these case reports are documentary evidence of his ability and that the material in them and the manner of presentation are important evidences of his ability.

### EXAMINATIONS

Candidates will go to a center designated by the Examination Committee (through the secretary's office) for a written and oral examination lasting three days, the first two of which will be devoted to the written examination. On the third day an oral examination will be given. The written examination will be given under the following headings, all as related to plastic surgery.

1. Theory and practice of plastic surgery.
2. Applied anatomy, applied physiology.
3. Pathology, bacteriology, clinical laboratory methods (pharmacology).
4. Reaction of tissue to injury; surgical accidents; anesthesia.

The candidate shall be required to receive a grade of 65 per cent in each portion of the written examination and an average grade of 75 per cent on the entire written examination.

At the time of the oral examination, the candidate will be required to examine, diagnose, and present a plan or plans of correction of cases presented by the examiners. In addition, a general oral examination pertaining to plastic surgery may be given.

Either prior to or following the above examination, the candidate should be visited at his place of practice by a member or members of the board to observe him operate and to examine a number of his preoperative and postoperative cases, if so desired.

### REEXAMINATIONS

Candidates who have failed in any portion of the examination may be admitted to another examination after one year, or within three years, except in such cases as the board may for good and sufficient reason deny a candidate the privilege of reexamination. The candidate must give sixty days' notice requesting a reexamination and pay a fee of $25.00 for the written reexamination and $25.00 for the oral reexamination.

1. An acceptable residency is one which has been approved by the Council on Medical Education and Hospitals of the American Medical Association jointly with this Board.

FEES

The fee for application and examination is $150; of this sum, $25 must accompany the application. The remaining $125 must be paid when the candidate is notified of acceptance for examination. There will be no refunds. This fee may be increased at the discretion of the board.

The board is a nonprofit organization. The fees of candidates are used solely for defraying the actual expenses of the board.

Because of the limited number of surgeons certified by this board it is necessary for a while to request a voluntary contribution of $10 annually from diplomates, after the first year's certification, to defray expenses of the board.

CERTIFICATION

After a candidate has met the requirements for eligibility and passed the examinations of the board, a certificate attesting his qualifications in plastic surgery will be issued to him by the board, signed by its officers, and having the seal of the board affixed thereto.

It is the board's prerogative to determine the fitness professionally and ethically of any candidate for its certificate, and the action or decision of the American Board of Plastic Surgery regarding the certification of any candidate shall be final.

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## AMERICAN BOARD OF PREVENTIVE MEDICINE AND PUBLIC HEALTH, INC.

Walter L. Bierring, Chairman, Des Moines, Iowa
Felix J. Underwood, Vice Chairman, Jackson, Miss.
Ernest L. Stebbins, Secretary-Treasurer, 615 North Wolfe Street, Baltimore.
Gaylord W. Anderson, Minneapolis.
J. H. Baillie, Toronto, Canada.
Floyd C. Beelman, Topeka, Kan.
Richard F. Boyd, Arlington, Va.
Matthew R. Kinde, Battle Creek, Mich.
Emil E. Palmquist, Seattle, Wash.
William P. Shepard, San Francisco.
James S. Simmons, Boston.
V. A. Van Volkenburgh, Albany, N. Y.
Reginald M. Atwater, Alternate, New York.

GENERAL QUALIFICATIONS

1. Moral and ethical standing in the profession satisfactory to the board.

2. Graduation from a medical school in the United States or Canada approved by the Council on Medical Education and Hospitals of the American Medical Association, or from a foreign medical school satisfactory to the board.

3. An internship of at least one year in a hospital approved by the Council on Medical Education and Hospitals of the American Medical Association or in a foreign hospital satisfactory to the board.

4. Licensure to practice medicine in the United States or the Dominion of Canada.

5. Special training in preventive medicine or public health which shall include:

(*a*) A period after internship of not less than six years of special training, teaching or practice in preventive medicine and public health which must include (*b*) and (*c*).

(*b*) Successful completion of at least one academic year of graduate study leading to the degree of Master of Public Health or an equivalent degree or diploma or an equivalent satisfactory to the board.

(*c*) Field training or residency of at least two years of field experience in general public health practice which included planned instruction, observation and active participation in a comprehensive, organized public health program, one year of which may be an approved clinical residency in a field directly related to public health.

6. Limitation of practice to teaching or practice of preventive medicine or public health as a specialty.

THE FOUNDER'S GROUP

The by-laws authorize the board for a limited period of time to excuse from examination practitioners of preventive medicine or public health who have attained unquestioned eminence in the field. This has been so defined as to include professors and associate professors of preventive medicine or public health in medical schools approved by the Council on Medical Education and Hospitals of the American Medical Association or in schools of public health accredited by the American Public Health Association, or individuals who have been or are president of one of the sponsoring societies designated in the certificate of incorporation, or have had at least ten years of distinguished service in the field of public health and are considered eligible by the board. Applicants for consideration as members of the Founder's Group must be received by July 1, 1950.

EXAMINATIONS

Examinations will be held from time to time and in various places depending on the need as indicated by applications received. It is expected that examinations will be held primarily in connection with the meetings of the American Public Health Association. The examination will consist of two parts:

Part one to consist of a comprehensive written examination designed to test the knowledge of the applicant in the general field of preventive medicine and public health. These examinations will be announced at least sixty days prior to the holding of the examinations. The written examination will be confined to one day.

Part two to consist of the oral or practical examination which will be held on the day following the written examination. This examination will be held before two to four examiners, members of the board or associate examiners. An endeavor will be made to adapt the details of the oral examination to each candidate's experience and practice. The examiners will report orally on each candidate to the assembled board, after which the results of the examination will be considered jointly by the entire board and the examiners. Final action of the board will be based on the candidate's ethical and professional record, training and attainments as well as on the results of his formal examination.

APPLICATIONS

Each application for examination for certification shall be in writing signed by the applicant and shall be filed with the secretary not less than ninety days prior to the date of the examination. Application must be on prescribed application forms. The application must be accompanied by an application fee and two recent, clear, unmounted, autographed photographs of the applicant.

FEES

The board is incorporated as a nonprofit corporation and no member of the board may receive any compensation. Minimum fees are specified, consistent with the cost of examination and certification. The total cost to the applicant is $50.00.

Application fee, $15.00. No application can be considered for classification and action by the eligibility committee unless accompanied by the application fee. The application fee is not refundable.

Certification fee, $35.00. This fee is payable when the candidate is notified of acceptance for examination or as a member of the Founder's Group. It is not returnable after the candidate has been officially accepted and notified by the eligibility committee to report for examination. All applications must be on the standard form and accompanied by the necessary documentation. No member of the board is authorized to give informal opinions as to the eligibility of the candidates. The determination of eligibility will be made only by the eligibility committee after receiving full application information. All candidates must comply with board regulations in effect for the year in which the examination is taken, regardless of when the original application was filed. Applicants declared ineligible for admission to examination may reopen their applications within two years of the filing date, without payment of an additional application fee. Applicants declared eligible but who fail to exercise the examination privilege within three years of the filing of the application are required to file a new application and to pay a new application fee.

CERTIFICATION

On satisfactory completion of the examinations or in the case of the Founder's Group, on the affirmative vote of the board, a certificate will be issued to the effect that the person named has been found to be possessed of the special knowledge in preventive medicine and public health. This certificate will be signed by the officers of the board and shall have its seal affixed. Each certificate shall remain the property of the corporation, but each person to whom a certificate is issued shall be entitled to its possession until revoked. Any certificate issued by the board may be revoked if evidence, satisfactory to the board, is presented that the applicant was not eligible at the time of application, or made any misstatement or misrepresentation of facts or that his license to practice medicine has been suspended or revoked.

## AMERICAN BOARD OF PROCTOLOGY

CURTICE ROSSER, President, Dallas, Tex.
GEORGE H. THIELE, Vice President, Kansas City, Mo.
LOUIS A. BUIE, Secretary-General, 102-110 Second Ave., S.W., Rochester, Minn.
GARNET W. AULT, Washington, D. C.
HARRY E. BACON, Philadelphia.
WALTER A. FANSLER, Minneapolis.
LOUIS J. HIRSCHMAN, Detroit.
LOUIS E. MOON, Omaha.
MARION G. PRUITT, Atlanta, Ga.
R. A. SCARBOROUGH, San Francisco.

The American Board of Proctology announces that it is preparing a booklet which will contain information pertaining to the requirements for eligibility, prerequisites, special training and clinical experience of candidates. The types of examinations, classes of certification, fees and other phases of its proposed activities will be delineated. This booklet will be completed within a short time and will be sent to those who have sent inquiries to the secretary general.

## AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY, INC.

JOHN C. WHITEHORN, President, Baltimore.
H. HOUSTON MERRITT, Vice President, New York.
FRANCIS J. BRACELAND, Secretary-Treasurer, 102-110 Second Avenue, S. W., Rochester, Minn.
DAVID A. BOYD JR., Associate Secretary, Rochester, Minn.
SPAFFORD ACKERLY Louisville, Ky.
BERNARD J. ALPERS, Philadelphia.
KENNETH E. APPEL, Philadelphia.
PERCIVAL BAILEY, Chicago.
LOUIS J. KARNOSH, Cleveland.
ROLAND P. MACKAY, Chicago.
FREDERICK P. MOERSCH, Rochester, Minn.
GEORGE H. STEVENSON, London, Ontario.
S. BERNARD WORTIS, New York.

APPLICATION FOR CERTIFICATES

An application, in order to be considered at any meeting of the board, must be in the hands of the secretary of the board not less than ninety days before the date of such meeting. A proper application form may be obtained from the secretary. Application may be made for certification in psychiatry or in neurology or in both fields. Applications will be formally considered only when made on the official application blank in such form as may be adopted from time to time by the board and when accompanied by an application fee in such amount as may be fixed by the board.

The secretary of the board on receipt of an application shall forthwith make inquiries from those to whom the candidate refers and from such other persons as the secretary may deem desirable and shall verify the candidate's record from the biographical records of the American Medical Association, after which he shall forward the application to the Committee on Credentials. This committee shall consider the application and other information available and notify the secretary whether the application is accepted. The certification of a candidate in either psychiatry or neurology, or both, shall be approved by a majority of the members of the entire board at a meeting held for such certification.

FORM OF CERTIFICATION

There shall be separate certification in psychiatry and in neurology and two certifications or a combined certification for those qualified in both fields. The certifications shall be in such form as is approved by the Board of Directors.

GENERAL REQUIREMENTS FOR APPLICANTS

Each applicant for a certificate must establish that:

(*a*) He is a physician duly licensed by law to practice medicine.

(*b*) He is of high ethical and professional standing.

(*c*) He is now a member of the American Medical Association, or a member of such medical societies as are recognized for purposes of certification by the Council on Medical Education and Hospitals of the American Medical Association. Exceptions to the foregoing may be made at the discretion of the board for good and sufficient reasons.

(*d*) He has received adequate training in psychiatry or neurology, or both, as a specialty.

CLASSES OF APPLICANTS

*Class A.*—Applicants who graduated from an approved medical school before the foundation of the board (1934) will not be held to the strict interpretation of the published requirements in formal graduate training. Under such circumstances the board will consider the training and experience of the applicant and decide whether or not he will be admitted to the examination.

*Class B.*—Applicants who graduated from an approved medical school after 1934 shall fulfil the following requirements.

PROFESSIONAL EDUCATION

1. Graduation from a medical school in the United States or Canada approved by the Council on Medical Education and Hospitals of the American Medical Association. In the case of an applicant whose training has been received outside the United States and Canada, such training must be satisfactory to the aforementioned Council.

2. Completion of a year's internship approved by the same Council in general medicine, general surgery, pediatrics or a rotating internship.

3. The nine month wartime internships will be accepted as an equivalent of one year.

SPECIALIZED TRAINING

Admission to the examination for certification in psychiatry or neurology requires a total of five calendar years of training and experience, three years of which must be specialized training obtained in approved training centers, plus two years of experience. Admission to the examination for certification in both psychiatry and neurology requires a total of six calendar years of training and experience, five years of which must be specialized training obtained in approved training centers, plus one year of experience. The specialized training may be subdivided into two and one-half years each in psychiatry and neurology or three years in one subject and two years in the other. The required years of experience should be spent in clinical practice with major responsibility for the care of patients.

This training for psychiatrists should include clinical work with psychoneurotic and psychotic patients, combined with the study of basic psychiatric sciences, medical and social psychology, psychopathology, psychotherapy and the physiological therapies, including a basic knowledge of the form, function and pertinent pathology of the nervous system. This training should be supervised and guided by teachers competent to develop skill and understanding in the utilization of such basic knowledge in dealing with patients. Mere factual knowledge is not sufficient. This training period should include instruction in the psychiatric aspects of general medical and surgical conditions and the behavior disorders of children and adolescents sufficient to develop practical ability to direct the treatment of such conditions. It should also include collaborative work with social workers, clinical psychologists, courts and other social agencies. The training program of the candidate

for certification in psychiatry should include sufficient training in neurology to enable him to recognize and to evaluate the evidences of organic neurological disease.

The training for neurologists should be based on clinical work with adults and children with neurological disorders, including the neurological complications of medical and surgical conditions. This shall be combined with study of basic neurological sciences, neuroanatomy, neurophysiology, neuropathology and neuroroentgenology. This training should be supervised and guided by teachers competent to develop skill and understanding in the utilization of such basic knowledge in dealing with patients. Mere factual knowledge is not sufficient. This training should include sufficient training in psychiatry to enable the candidate to recognize and to evaluate the common psychiatric reactions.

The board offers the foregoing two paragraphs as an outline of desirable training. If, however, the candidate has evidence of equivalent qualifications of training and experience not in the pattern here formulated, this experience with appropriate documentary support may be included in his application for evaluation and possible approval by the board.

Candidates seeking certification in both neurology and psychiatry or supplementary certification in one after being certified in the other must submit evidence satisfactory to the board of an additional two years of full time basic training in the supplementary specialty.

Thus, no candidate is eligible for examination by the board until he has completed at least five years of special training and experience in neurology or psychiatry for a single certificate, or at least six years of special training and experience in neurology and psychiatry for certification in both neurology and psychiatry.

The board will give not more than six months of credit for not less than six months of training in an approved training center for internal medicine or pediatrics in lieu of six months of experience to candidates for the certificate in psychiatry or neurology, but not to candidates for certification in both psychiatry and neurology.

The board will give credit for one year of training in child psychiatry provided it is the third year of the required three years of special training required by the board and providing it is taken in a center approved by this board for training in child psychiatry.

The lists of training programs approved by this board and by the Council on Medical Education and Hospitals of the American Medical Association may be found in the current issue of the Internship and Residency Number of THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.

The secretary may at his discretion admit to examination candidates who lack not more than two months of the time requirement for certification with the understanding that the certificate will in no case be issued until satisfactory written evidence of completion of this requirement is submitted to the board.

### TRAINING IN THE ARMED FORCES

Credit will be granted for one year of wartime military service in the Army, Navy, Public Health Service and Veterans Administration. Wartime to this board means Dec. 7, 1941 to Feb. 15, 1946. Further credit for specialized training will be granted only if the candidate has received training in an institution recognized by the Council on Medical Education and Hospitals of the American Medical Association and approved by this board. Time beyond one year spent in the above Government agencies may be credited to experience, providing the candidate has been regularly assigned to a service in neurology or psychiatry.

### EXAMINATIONS

Date and places of examinations are set by the board at its discretion and are announced in THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, in the *American Journal of Psychiatry*, in the *Journal of Nervous and Mental Diseases*, and in the *Archives of Neurology and Psychiatry*.

The examinations are designed to test the competence of the candidates. The board requires some proficiency in neurology on the part of those it certifies in psychiatry, and vice versa, but examines the candidate in accordance with the certificate he seeks. The examinations will be of such type that no adequately trained person will fail and yet they will be sufficiently searching so that the specialist in fact may be separated from the specialist in name. The practical examination will include the examination of patients under the supervision of the examiner. The manner of examining patients, and the reasoning and deductions therefrom, will constitute an important part of the examination. Oral and practical examinations will be given in the basic sciences with special regard to their clinical implications. Written examinations may be given at the discretion of the board. The examination for certification in psychiatry will differ from the examination for certification in neurology.

### PAYMENT OF FEES

The candidate on filing his application shall accompany it with an application fee of $25 which is not returnable. If a preliminary written examination has been decreed, an additional $25 fee will be required at the time of the applicant's acceptance. When notified by the secretary that he is eligible for the oral and practical examination, the candidate shall send the secretary an examination fee of $50. A candidate who has been certified in either psychiatry or neurology and who has been admitted to supplementary examination for the other certificate shall pay an additional examination fee of $50.

A candidate who has failed in one examination is eligible for reexamination within one year on payment of a reexamination fee of $25.

After the year has elapsed he must submit a new application and pay new application and examination fees. If he fails the reexamination, he may, after two years have elapsed, submit a new application and $25 fee, present evidence of further training and pay an examination fee of $50.

A candidate who fails in one or two subjects is eligible for reexamination in those subjects within one year on payment of a reexamination fee of $25. After the year has elapsed he must submit a new application and pay new application and examination fees and repeat the entire examination. If he fails the reexamination, he may apply again for the complete examination after two years on submission of evidence of further training and on payment of an application fee of $25. If admitted to the examination, he must pay a new examination fee of $50.

Any candidate who finds himself unable to attend an examination to which he has been admitted and does not notify the Secretary at least six weeks before the date of the examination will forfeit half of his examination fee. Any candidate who fails to appear for examination within a period of three years following the date of notification of eligibility for examination shall be required to submit a new application and pay the attendant fee. If a candidate dies before his certificate is issued, all fees will be returned to his estate.

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## AMERICAN BOARD OF RADIOLOGY, INC.

I. H. LOCKWOOD, President, Kansas City, Mo.
DOUGLAS QUICK, Vice President, New York.
B. R. KIRKLIN, Secretary-Treasurer, 102-110 Second Avenue, S.W., Rochester, Minn.
RALPH S. BROMER, Bryn Mawr, Pa.
RAY A. CARTER, Los Angeles.
D. S. CHILDS, Syracuse, N. Y.
L. H. GARLAND, San Francisco.
ROSS GOLDEN, New York.
E. L. JENKINSON, Chicago.
H. DABNEY KERR, Iowa City.
F. W. O'BRIEN, Boston.
J. W. PIERSON, Baltimore.
U. V. PORTMANN, Cleveland.
LEO G. RIGLER, Minneapolis.
B. P. WIDMANN, Philadelphia.

### CERTIFICATES

A certificate will be issued to each candidate who meets the requirements of the board, to the effect that the holder of the certificate has had adequate training in radiology and has successfully fulfilled the requirements of the board.

A certificate granted by this board does not of itself confer, or purport to confer, any degree, or legal qualifications, privileges or license to practice radiology. Certificates of the board shall be issued on one of two forms:

1. A certificate to the effect that the applicant has been found qualified to practice radiology in all its branches.

2. A certificate to the effect that the applicant has been found qualified to practice radiology in one or more of the following special fields: (*a*) roentgenology; (*b*) diagnostic roentgenology; (*c*) therapeutic radiology.

### DEFINITIONS

For the purposes of this Board, the following definitions are adopted:

1. Radiology is that branch of medicine which deals with the diagnostic and therapeutic application of radiant energy including roentgen rays and radium.

2. Roentgenology is that branch of radiology which deals with diagnostic and therapeutic application of roentgen rays.

3. Diagnostic roentgenology is that branch of radiology which deals with the diagnostic application of roentgen rays.

4. Therapeutic radiology is that branch of radiology which deals with the therapeutic application of roentgen rays and radium.

### GENERAL REQUIREMENTS

Each applicant for admission to the examination shall be required to present evidence that he has met the following standards:

#### A. General Qualifications

1. Satisfactory moral and ethical standing in the profession.

2. A license to practice medicine in the state or county in which he resides.

3. Membership in the American Medical Association, or membership in such Canadian or other medical societies as are recognized for this purpose by the Council on Medical Education and Hospitals of the American Medical Association. Except as herein provided, membership in other societies shall not be required.

4. That the applicant holds himself out to be a specialist in radiology or one of its branches as defined under "definitions," and that he devotes his time primarily and principally (at least 75 per cent) to the practice of radiology or one of its branches.

5. That he is a citizen of the United States or Canada. Candidates from other countries must be permanent residents of that country and native citizens thereof.

#### B. General Professional Education

1. Graduation from a medical school recognized by the Council on Medical Education and Hospitals of the American Medical Association. If the applicant is a resident of the United States or one of its possessions and is a graduate of a medical school outside the United States or Canada, he must have a certificate of the National Board of Medical Examiners.

2. Completion of an internship of not less than one year in a hospital approved by the same Council.

#### C. Special Training

1. After completion of the internship there shall be a period of special training in Radiology of not less than three years in clinics, hospitals or d'spensaries recognized and approved by the American Board of Radiology and the Council on Medical Education and Hospitals of the American Medical Association as competent to provide a satisfactory training in radiology. This period of specialized training shall include:

(*a*) Graduate training in pathology, radiation physics and radiobiology. A period of six months full time training in pathologic anatomy is recommended but, where this is not possible to arrange, the student during his three year training period may, by attending pathologic conferences, postmortem examinations and studying removed tissues, receive adequate training in pathology. It is recommended that radiation physics be taught by a combination of didactic lectures, practical examples and direct clinical demonstrations.

(*b*) An active experience (residency) of not less than twenty-four months in an institution, the radiologic department of which is recognized and approved by the American Board of Radiology and the Council on Medical Education and Hospitals of the American Medical Association as capable of providing satisfactory training.

(*c*) Examination in the basic sciences of radiology as well as the clinical aspects thereof. These examinations should be given by the student's instructors in order to allow those responsible for his training to certify to the board that he is adequately prepared.

In the current emergency the Board will allow one year of military service spent in a radiology department in the United States Army, Navy or Marine Corps to be applied toward the satisfaction of one year of graduate training.

At its annual meeting in Chicago in June 1948 the board decided to grant credit for preceptor type training provided the candidate first spends two years in an approved x-ray department on a formal residency basis. Then the board will give credit for two years' preceptorship in lieu of the third year of residency training provided the preceptor is acceptable to the board. This program is now in effect.

### APPLICATIONS

The board desires to appraise the candidate's educational opportunities (premedical, medical and radiologic), the ability of his instructors, his hospital and teaching positions, his original investigations, his contributions to radiologic literature, his membership in medical societies and his local and general reputation.

For this purpose, application must be made on a special blank which may be obtained from the secretary. No application will be considered unless made on the regular application blank. This application shall be forwarded with the required data, two unmounted photographs and the fee of $50 at least two months before the date of the examination.

### FEE

A fee of $50 must accompany each application blank. This fee will not be returned, and no application will be considered until the fee is received. This fee has been carefully computed and is used entirely for administrative purposes. Members of the board and special examiners do not receive any compensation except for actual expenses connected with holding the examinations. As the number of candidates decreases, it may become necessary to raise the fee.

### EXAMINATIONS

Each year the board will hold an examination in conjunction with the annual meeting of the American Medical Association, and, when sufficient applications are on file, a second examination will be held in conjunction with the annual meeting of the American Roentgen Ray Society and/or the Radiological Society of North America.

For the present, examinations consist of practical and oral examinations, although written examinations may be added later. The examinations are designed to test the candidate's fitness to practice radiology or one of its branches as a specialty. The board will endeavor to adapt this examination to the candidate's experience and years of practice. It will try especially to ascertain the breadth of his clinical experience, his knowledge of the basic sciences of radiology, and likewise his knowledge of the recent literature on radiology, and his general qualifications as a specialist in this branch of medicine.

The examination consists of tests in film interpretation and an oral examination in pathology, physiology, radiophysics and radiobiology, as well as the clinical applications of roentgen rays and radium. The applicant is also examined in "professional adaptability," in an attempt to ascertain his attitude toward his fellow practitioners and his patients.

Whenever an applicant fails to pass the examination, the board, if requested, will make suggestions as to suitable courses of instruction for the purpose of overcoming his deficiencies.

### REEXAMINATIONS

If the candidate fails in the first examination he will be admitted to a second examination after one year has elapsed but not more than three years. He must give sixty days'

notice of his intention to appear for reexamination and pay an additional fee of $25. If a candidate who has failed does not appear for reexamination before the expiration of three years, he will be required to make a new application and pay an additional fee of $50.

A candidate having failed twice may, after one year has elapsed, file a new application which must be accompanied by the fee of $50.

## AMERICAN BOARD OF SURGERY

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WARREN H. COLE, Vice Chairman, Chicago.
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PETER HEINBECKER, St. Louis.
THOMAS H. LANMAN, Boston.
LELAND S. McKITTRICK, Boston.
ROBERT M. MOORE, Galveston, Texas.
JOHN H. MULHOLLAND, New York.
FREDERICK L. REICHERT, San Francisco.
CALVIN M. SMYTH, Philadelphia.

### REQUIREMENTS

The requirements for all candidates will be as follows:

*General Qualifications*

1. Moral and ethical standing in the profession satisfactory to the board.

The board, believing that the practice of "fee splitting" is pernicious, leading as it does to a traffic in human life, will reserve the right to inquire particularly into any candidate's practice in regard to this question.

2. Those whose activities are limited 100 per cent to the practice of surgery. This includes diagnosis, preoperative and postoperative care. It does not include obstetrics without surgical complications, or the general practice of medicine.

### PROFESSIONAL STANDING

1. Graduation from a medical school of the United States or Canada recognized by the Council on Medical Education and Hospitals of the American Medical Association, or graduation from a foreign school considered acceptable by the board.

2. Completion of an internship of not less than one year in a hospital approved by the same Council, or its equivalent in the opinion of the board. This internship may be rotating or one devoted to a single branch of medicine as, for example, surgery, medicine, pathology.

### SPECIAL TRAINING

Candidates who have the following requirements will be eligible for consideration by the board:

Group I[1]—Four years of education in surgery in a graded residency in one or more institutions. The training programs of hospitals must be approved by an appropriate committee of the board, in addition to the approval of the hospital for graduate training by the Council on Medical Education and Hospitals of the American Medical Association, or the American College of Surgeons. One year of the four may be in a subspecialty of surgery, such as thoracic, plastic, cancer or orthopedic surgery, proctology or gynecological surgery. If the second year of a two year internship is surgical and in a hospital approved for graduate training, it will be acceptable on the aforementioned four years.

Group II[2]—In lieu of the requirements for Group I, the board will continue to accept, for the present, three years of acceptable residency training, followed by two years of study or practice of surgery. The latter two years may be taken under one certified by the board and carrying on his practice in hospitals fully approved as meeting the minimum hospital requirements of the American College of Surgeons.

Each candidate must have three years' acceptable training in general surgery. It is desirable that the three years of acceptable residency training of Group II applicants precede the two years allowed in the study or practice of surgery, although this is not essential. Not more than two of the five years required of Group II applicants may be spent in the subspecialties of surgery, such as those listed above.

### EDUCATIONAL REQUIREMENTS EFFECTIVE JULY 1, 1950

The educational requirements listed below become effective for all candidates after July 1, 1950. In the interim the board will continue to give credit for the training received in institutions that have residencies which are approved by the American College of Surgeons and the Council on Medical Education and Hospitals of the American Medical Association.

Group 1. In addition to one year of internship or its equivalent, a candidate must have a minimum of four years of training in surgery in an institution or institutions acceptable to the board. Three of these years must be spent in an approved residency or clinical fellowship. One year may be spent in a surgical specialty, or experimental surgery or research, or work of such a character that the relation of the basic sciences of anatomy, physiology, pathology, bacteriology, biophysics and biochemistry to surgery is emphasized. The board does not insist that any special length of time be spent in the basic sciences, but knowledge of these sciences as applied to clinical surgery will be required in the examination. One year's credit, however, will be given to recognized graduate school courses in these basic sciences if such courses are an integral part of an acceptable university medical school. The board will not, however, give credit for any post-graduate course of less than six months' duration.

During these four years of training a candidate must:

1. Hold positions of increasing responsibility for the care and management of patients with surgical conditions.

2. Have sufficient operative experience to acquire surgical skill and judgment through the performance of surgical operations with a high degree of responsibility but under circumstances providing adequate opportunity for consultation and advice.

Group 2. The board realizes that there is not as yet an adequate number of four-year graded residences (Group 1) to meet the needs of the country for qualified surgeons. Therefore, the board will continue to recognize three years[3] of acceptable residency training, in one institution or institutions acceptable by the board, followed by two years of study or practice of surgery, during which time sufficient operative experience to meet the board's requirements must be obtained. The latter two years must be taken under the supervision of a surgeon certified by or acceptable to the board, and carrying on his practice in hospitals approved as meeting the minimum hospital requirements of the American College of Surgeons. Now more than two of the five years required by Group 2 applicants may be spent in the subspecialties of surgery.

At the completion of training the board will request responsible representatives of the institution in which the candidate has had the major portion of his training to attest to his character and professional competence, and to recommend that he be admitted to its examinations. This requirement is applicable to candidates in both groups.

After July 1, 1950, approval will be given for experience obtained in institutions having training programs of less than three years only when such a program is affiliated with and forms an integral part of an accepted graded residency.

### BASIC SCIENCES

This entire period of special training shall be of such character that the relation of the basic sciences of anatomy, physiology, pathology, bacteriology and biochemistry is emphasized.

1. A graded residency includes a period of training in which the trainee has increasing responsibility for the care and management of surgical patients. Adequate operative experience in which the candidate has assumed the whole responsibility will be required.

2. An acceptable residency is one approved for graduate training in surgery by the American College of Surgeons or the Council on Medical Education and Hospitals of the American Medical Association.

3. When a candidate receives his training in more than one institution, it is imperative that he hold positions of increasing responsibility.

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The board does not insist that any special length of time be spent in the basic sciences, but knowledge of these sciences as applied to clinical surgery will be required in the examination. One year's credit, however, will be given to recognized graduate school courses in these basic sciences which are an integral part of an acceptable university medical school. The board does not recognize short postgraduate courses for credit on the five years required of Group II candidates.

As a rule, not more than six months' credit is allowed for one year or more spent in any one of the basic sciences unless the candidate can show evidence of special training during this period, such as research, teaching, and so on, directly under the supervision of, and an integral part of an acceptable institutional training program in surgery. Under no circumstances, however, will more than one year's credit be given for work in the basic sciences.

### MILITARY CREDIT

Candidates who were on active duty in the armed forces for one to two years and who entered these services prior to V-J Day (Aug. 15, 1945) will be given one year military credit. Additional military credit may be allowed, at the board's discretion, during the war emergency (six months after V-J Day, or Feb. 15, 1946) if the candidate furnishes evidence of adequate surgical experience on a suitable surgical service under acceptable supervision. In no instance, however, will the board give full credit for military service during the war emergency. Maximum credit will be limited to two years for such service. Subsequent to Feb. 15, 1946, credit for military service will be given on the same basis as in civilian training as described elsewhere. Credit for military service may be applied to the residency requirement as outlined for Group II candidates, but military credit is not allowed for Group I candidates.

### REQUIREMENTS FOR FOREIGN BORN AND FOREIGN TRAINED APPLICANTS

Full citizenship status is required of residents of the United States. United States citizens who are residents of other countries, and citizens of other countries must have completed at least the three year residency training requirements in a hospital in the United States. In addition, they are required to hold a license to practice surgery in the country in which they are resident or hold citizenship.

### APPLICATIONS

Prospective candidates considering themselves eligible for examination should submit a letter to the board's office outlining briefly, in concise and chronological order, their qualified training since graduation from medical school. If the prospective candidate's letter appears to meet the minimum requirements, an application form will be mailed to the candidate for completion. The processing of the completed application by the board's office and the Examination Committee requires a minimum of three months. The candidate will then be notified by the Secretary as to his acceptability for examination, his deferment or ineligibility.

The eligibility of candidates whose training in some respects does not conform to requirements published above will require the action of the Examination Committee, which may postpone the candidate's notification of acceptability. Every candidate's final acceptability for examination is based not only on the evaluation of his training qualifications, but on recommendation by the board's advisors as to his professional ability as a surgeon, his ethical standing in the community and the strict limitation of his work to surgery.

### THE FOUNDERS GROUP

The Founders Group, to which were admitted those who had already amply demonstrated their fitness as trained specialists in surgery, was closed in January 1940.

### EXAMINATIONS

The qualifying examination will be divided into Part I (written) and Part II (clinical, bedside and laboratory). In both of these parts, as previously stated, a knowledge of the practical application of the sciences fundamental to surgery will be required.

*Part I.* This examination will be given simultaneously in as many centers throughout the country as the board may determine suitable for the purpose, and is held twice a year, in the Spring and Fall. All applications must be on file in the board's office at least three months in advance of the examination. Candidates who are declared eligible are given ample notice as to the center to which they have been assigned for examination.

The examination in Part I is written and covers a one day period. There shall be two sessions of three hours each. The examination concerns itself primarily with general surgical problems and in addition the application of the basic sciences of surgery to these problems.

*Part II.* In order to be eligible for Part II, a candidate must have successfully passed Part I. In addition, the board requires that a satisfactory operative report must be filed for every candidate prior to his examination in Part II. Such a report shall be made by a member of the board, Founders Group, or one certified by examination, designated to be present during a major operative procedure performed by the candidate.

Part II of the examination shall be oral and practical and cover a one day period, the schedule being arranged somewhat as follows:

9 A. M.-1 P. M.—Clinical surgery (diagnosis, management and the application of physiology, biochemistry and bacteriology, as the case being examined on may offer an opportunity for doing so. Roentgenographic interpretation will also be included).

2-5 P. M.—Applied Anatomy and Surgical Pathology.

The board expects that every candidate shall be well prepared in applied anatomy. In surgical pathology more stress is laid on the gross than on the microscopic, although candidates are expected to recognize the less difficult microscopic slides showing examples of frank malignancy, tuberculosis, inflammation, and so on.

Examinations in Part II are conducted in certain centers of the country selected by the board. It is the board's desire to arrange these centers so as to geographically meet the needs of the candidates, on condition that suitable examination facilities can be provided. Examinations in Part II are conducted by members of the board living in the region of the country in which they are held, together with selected members of the Founders Group resident in the centers chosen.

### GRADES

A candidate must receive an average of 75 per cent for each part to be entitled to the board's certificate.

A candidate who fails in his examination in Part I shall have his papers reviewed by the Examination Committee.

### REEXAMINATIONS

*Part I.* Candidates who fail Part I are required to wait one year before becoming eligible for reexamination.

*Part II.* Candidates who fail Part II in its entirety and those who fail in the single subject of clinical surgery are required to wait one year before establishing eligibility for reexamination. Those who fail either anatomy or pathology are required to wait six months. The board expects that during this period the candidate will make a reasonable effort to prepare himself in the subject or subjects in which he has failed.

Should a candidate fail one examination in parts I and II, further examination privileges will be decided in each individual instance by the Examination Committee, but only after the candidate has submitted satisfactory evidence of further substantial preparation. The board may, for good and sufficient reason, deny a candidate the privilege of further reexamination.

### FEES

The fee for the examination is $100.00, payable as follows: $10.00 registration fee, $30.00 for Part I and $60.00 for Part II.

Candidates shall be required to pay a fee of $30.00 for reexamination in Part I and $60.00 for reexamination in Part II.

This board is a nonprofit organization. All fees will be used, after a reasonable amount is set aside for necessary expenses in maintaining its office, conducting examinations, and so on, to aid in improving existing opportunities for the training of the surgeon.

CERTIFICATE

After meeting the requirements for eligibility and passing the examination, a certificate attesting to a candidate's qualifications in surgery will be issued by the board, signed by its officers.

## BOARD OF THORACIC SURGERY

(A Subsidiary Board of the American Board of Surgery)

CARL EGGERS, Chairman, New York.
CAMERON HAIGHT, Vice Chairman, Ann Arbor, Mich.
WILLIAM M. TUTTLE, Secretary-Treasurer, 1151 Taylor Avenue, Detroit 2, Mich.
WILLIAM E. ADAMS, Chicago.
FRANK E. BERRY, New York.
BRIAN B. BLADES, Washington, D. C.
THOMAS H. BURFORD, St. Louis.
MICHAEL E. DEBAKEY, Houston, Tex.
EMILE HOLMAN, San Francisco.
GEORGE H. HUMPHREYS, New York.
RICHARD HARWOOD SWEET, Boston.

FUNCTIONS OF THE BOARD

1. To select Founder Members. This group is composed of surgeons, who have made meritorious contributions to thoracic surgery, as follows:

a. Active and senior members of the American Association for Thoracic Surgery, who have been certified by the American Board of Surgery, are eligible for consideration as Founder Members.

b. Other surgical members of the American Association for Thoracic Surgery will have their records reviewed by the board, and may be recommended for Founder Membership with or without application.

c. Other surgeons, certified by the American Board of Surgery, who on application, and after review of their qualifications, are found to meet the requirements of the thoracic board.

The Founders Group will be kept open for two years after the organization of the board.

2. To conduct examinations of satisfactory candidates who seek certification by the board.

3. To improve the opportunities for the training of thoracic surgeons.

4. To set up principles of education to guide young surgeons who desire to prepare themselves for proficiency in thoracic surgery.

5. To issue certificates of qualification to all those meeting the board's requirements.

REQUIREMENTS

1. Certification by the American Board of Surgery.

2. Two years' training in thoracic surgery approved by the Board of Thoracic Surgery, or meritorious contributions to thoracic surgery. One of these two years may be spent during the four years of training in surgery required by the American Board of Surgery.

3. Written, oral and practical examination.

DEFINITION

To qualify for the examination in thoracic surgery, the candidate shall have had two years of training in an active, well-integrated thoracic surgical clinic or clinics, or the equivalent amount of thoracic surgical training, on a mixed service consisting of thoracic and nonthoracic surgical cases. Adequate training in both the tuberculous and nontuberculous aspects of thoracic surgery is expected. In order to obtain this objective, combined residencies between institutions of different types may be advantageous. It is also required that the candidate be familiar with the basic sciences as related to thoracic surgery. Under exceptional circumstances certain surgeons may, by virtue of recognized proficiency in the surgical treatment of thoracic diseases, qualify for the examination at the discretion of the board.

APPLICATIONS

Prospective candidates desiring to apply for examination should consider whether they are able to meet the minimum requirements of the board. They should then submit a letter to the secretary's office, outlining briefly their training and experience in thoracic surgery and ask for an application form. An application form will not be sent unless evidence is submitted in a letter indicating that the prospective applicant appears to meet the minimum requirements.

EXAMINATIONS

The Board of Thoracic Surgery will be governed in general by the rules laid down by the American Board of Surgery pertaining to examination, as well as reexaminations.

Rules may be changed, however, at the discretion of the Board of Thoracic Surgery.

FEES

*Founders Group.* To those who will be admitted to this group, a certificate will be issued. The fee will be $50.00.

Group to be certified by examination. For the special examination in thoracic surgery and the issuing of a certificate, the fee will be $100.00. Fifteen dollars of this fee is to accompany the application and will be considered as a registration fee. It is nonreturnable to the applicant in case he is disapproved for examination.

*Reexamination.* The fee for reexamination will be $25.00.

## AMERICAN BOARD OF UROLOGY, INC.

GILBERT J. THOMAS, President, Beverly Hills, Calif.
GEORGE F. CAHILL, Vice President, New York.
HARRY CULVER, Secretary-Treasurer, 7935 Sunnyside Road, Minneapolis 21.
GEORGE GILBERT SMITH, Brookline, Mass.
EDGAR BURNS, New Orleans.
CHARLES C. HIGGINS, Cleveland.
A. I. DODSON, Richmond, Va.
GRAYSON CARROLL, St. Louis.
THOMAS D. MOORE, Memphis, Tenn.

APPLICATION BLANK; REQUIREMENTS FOR ALL APPLICANTS

Application for certification must be made on a special form. This will be provided by the secretary and must be returned to him accompanied by other required data and credentials, and by $35 of the examination fee.

*Requirements for Applicants.*—Each applicant, before he shall become eligible to take the examination for certification in urology, must:

A. Have graduated from a medical school of the United States or Canada recognized by the Council on Medical Education and Hospitals of the American Medical Association and must have completed an internship of not less than one year in a hospital approved by the same council. (The former requirement is not applicable to a candidate who graduated from an institution now extinct or whose graduation occurred before the American Medical Association had prepared a list of accredited medical schools.) All graduates of foreign medical schools must obtain a license in the state or province in which they propose to practice medicine, the certificate of the National Board of Medical Examiners and/or the certificate of graduation from a medical school recognized by the Council on Medical Education and Hospitals of the American Medical Association as capable of providing training comparable with that recognized in a "Class A" medical school.

B. Establish in a manner satisfactory to this board that he is a physician duly licensed by law to practice medicine, that he is of high ethical and professional standing and that he has received adequate special training in urology.

The board is attempting to increase and to standardize the facilities for urological training in teaching institutions, so that the expression "special training in urology" may be interpreted to include:

1. A period of study, after the internship, of not less than three years in clinics, dispensaries, hospitals or laboratories recognized by the Council on Medical Education and Hospitals of the American Medical Association as competent to provide a satisfactory training in the special field of urology.

The training requirements after the internship may be fulfilled in one of the following ways.

(*a*) A three year residency in urology.

When a resident obtains a senior rating or is in his final year of training, he should be in charge of the examination and

treatment (surgical or otherwise) of an ample number of patients under the supervision of the senior consultant or attending urologist, who must be certified by the American Board of Urology.

(*b*) A second year of rotating internship or a one year residency, preferably in general surgery, followed by a two year urologic residency, which should have the same status as the last two years of a three year urologic residency.

(*c*) Preceptorship.

This type of training may be accepted, but it is not encouraged. This, and other variations from training described above, must be supported by evidence that the candidate has had training comparable with one of the two preceding types of residencies.

2. An additional period of not less than two years in the practice of urology in the city from which he makes application.

C. Make application to The American Board of Urology, Inc., whose duty it shall be to investigate the applicant's credentials and make a survey of his character.

D. Assure the board that he is engaged in the practice of urology and that he intends to continue to be so engaged.

E. Membership in the American Medical Association or comparable national medical association is recommended.

### FEE

The examination fee is $100 (this fee will be increased when the expense of the examinations and other activities of the board demand). Thirty-five dollars must accompany the application. If, on investigation, an applicant is found lacking in any of the requirements stated herein, he will be notified that he is ineligible for examination. Sixty-five dollars must be paid when the applicant is accepted as a candidate for certification. Neither fee shall be returnable in any event.

If a candidate fails, he will be permitted a second examination after one year or within three years, without additional fee, but he must give sixty days' notice of his intention to appear for reexamination. After an applicant has failed twice, he must file a new application and pay a second fee.

### REQUIREMENTS FOR CERTIFICATION

According to the by-laws of the American Board of Urology, Inc., applications received from applicants for certification shall be examined by the Credentials Committee and reviewed by the board. When additional data are required to complete the application, these will be requested by the secretary.

The requirements for certification include: personal appearance before the board; preparation of reports of fifty major urological cases, under the candidate's own supervision, which must contain all items essential for diagnosis, therapy and prognosis and results of treatment; oral-clinical examinations, and written examinations.

In specific instances, the board may waive any part of these requirements, with the exception of the item of personal appearance.

Each candidate will receive a notice of the time and place of the examinations, and an appointment for his personal appearance before the board.

### EXAMINATIONS; REPORTS OF CASE HISTORIES

Oral-Clinical and Pathology, given once a year, usually in February and usually in Chicago, Illinois. Basic sciences, given about ninety days before the February meeting. This examination is given in various cities throughout the country and is proctored by certificatees of the board.

Definite appointments for the examinations will be assigned after candidates have fulfilled other requirements.

The written examinations are designed to test the candidate's preparation in, and his knowledge of, the whole field of urology, including the fundamental subjects: pathology, anatomy, physiology, embryology, bacteriology, physiological chemistry and endocrinology. The examination in pathology will consist of the identification of gross specimens and sections of tissue observed through the microscope. The examination in anatomy, physiology, embryology, bacteriology, physiological chemistry and endocrinology will be a test of the candidate's working knowledge of these subjects as they are related to the practice of urology.

The oral-clinical examination will consist of discussions of common urological conditions. The subjects forming the basis of this examination are urography; diseases of the genital organs, including the prostate; diseases of the urinary bladder and diseases of the ureters and kidneys. The examination may deal directly with data found in the reports of case histories that the candidates have submitted. It will ascertain the candidate's familiarity with recent literature, the breadth of his clinical experience and his general qualifications for practice in the specialty of urology.

The professional adaptability of each candidate will be investigated in an attempt to determine his ethical conduct and his attitude toward his patients and fellow practitioners.

The reports of 50 major urological cases must be consecutive and must have been under the candidate's own supervision. They must not be abstracted. Twenty-five of the case histories may come from a candidate's final year of training. The second twenty-five, making the total of fifty required, must come from the candidate's practice. All cases must be concerned with patients on whom the candidate has done the operative procedures. Sufficient data should appear in these so the examiner will know that a proper history was taken and that a thorough examination, including a complete physical survey, was made. The histories should be examples of the various types of major urologic surgery. These should represent renal, ureteral bladder, and a genito-urinary surgery.

Case reports that are copied verbatim from a hospital record are not accepted. They must be identified by the name of the hospital and the case admission numbers, with the pertinent dates. The reports must be typewritten on 8½ by 11 paper and in duplicate, but need not be on any special forms.

The data should be placed under proper headings and the arrangement of these should conform to the sequence of events incidental to the patient's admission to the hospital or clinic, the examinations made and treatment prescribed.

The board requires that all of the essential points of the history and examination, as well as a complete description of the surgical procedure, shall be given. Emphasis should be placed on the following items: preoperative diagnosis, clinical and pathological diagnosis, laboratory data, including cultures of urine and chemical analysis of calculi; summary of postoperative course with special reference to morbidity, clinical findings at time of discharge from the hospital and subsequent "follow-up" reports.

A final short paragraph must be prepared for each case. This must include the candidate's interpretation of the history in terms of pathology; the basis for the diagnosis; the facts that determined the treatment prescribed, whether surgical or otherwise; the course of treatment to be pursued following discharge from the hospital or clinic; a critical discussion of the knowledge gained from the proper handling of the case, or from the errors made (if any) in the diagnosis and method of treatment.

Complete separate index lists must accompany the reports. If the reports are obtained from more than one hospital they must be consecutive and a separate index list of each group should be provided. These lists must state the operator's name at the head of each page, the name of the patient, the hospital and admission number and the dates of operation. Statements from the superintendents of the hospitals attesting that the candidate was the operator must be included. The lists will be filed in the secretary's office for verification purposes.

Each candidate must assume personal responsibility for the data in his case reports, including autopsy findings and interpretation of urograms.

A candidate must remember that these case reports are documentary evidence of his ability and that the material in them and the manner of presentation are important evidences of his competence as a urologist.

Satisfactory case reports must be submitted before a candidate will be permitted to continue with other parts of his examination. If case reports are pronounced unsatisfactory by more than one examiner, the candidate will be informed of this and requested to prepare others.

Case reports must be submitted to the secretary of the board by September 1.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION
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SATURDAY, SEPTEMBER 3, 1949

NOTE.—Because of the extensive material required for medical education in this issue of THE JOURNAL, several of our regular departments are omitted.—ED.

## THE FORTY-NINTH ANNUAL REPORT ON MEDICAL EDUCATION

The forty-ninth annual report of the Council on Medical Education and Hospitals which appears in this issue of THE JOURNAL summarizes basic data concerning medical schools and students in the United States and Canada and contains other significant information on medical education.

The freshman class that entered medical school in the fall of 1948 was the largest ever admitted to the medical schools of the United States. Preliminary reports from the schools indicate that the 1949 freshman class will be even larger by some 200 students. Part of the increase results from an increase in the number of approved schools. Moreover, the facilities of several existing schools have been expanded and the schools are accepting as many students as they can accommodate without a serious lowering of standards.

On the basis of the new schools that are already being organized and the expansion of existing schools that is now under way, the freshman class in the medical schools of the United States will shortly exceed 7,000 students. The average size of the freshman class in the ten years preceding the war was 6,016. Thus a significant increase is occurring in the facilities for medical education in this country. This increase is gradual and is developing without the lowering of standards that would inevitably have resulted if the medical schools had abruptly enrolled a large number of additional students. Such an event might have hastened by three to five years an increase in the number of graduates, but lowering of the standards of medical education and of the quality of medical care would have been certain. Experience has demonstrated that proper facilities for medical education, including staff, laboratories and hospitals, cannot be developed on short notice.

Final plans have been completed for the survey of medical education in the United States sponsored by the Council on Medical Education and Hospitals and by the Association of American Medical Colleges. Visits to the medical schools will begin this month. Teams composed of two or three men will spend five to ten days at each of the medical schools in the United States during the next two years. The report of the Council outlines the fourteen major aspects of medical education on which this comprehensive survey will concentrate.

The analysis this year, for the first time, of certain basic data for the medical schools grouped according to whether they are publicly or privately owned is particularly interesting. During the past year, of the seventy-eight approved medical schools and schools of the basic medical sciences in the United States, forty-four were owned by private nonprofit corporations and thirty-four were owned by states or municipalities. Of the total of 23,670 medical students in the United States during the past academic year, 59.7 per cent were enrolled in private schools and 40.3 per cent in governmental schools. Graduates during this period numbered 5,094, of whom 61.8 per cent were from private schools and 38.2 per cent from publicly owned schools. During the coming academic year three of the privately owned medical schools, Syracuse, Long Island and Southwestern, will become part of state university systems, thus increasing the number of publicly owned schools to thirty-seven and reducing the number of privately owned schools to forty-one.

During and after the war almost all medical schools experienced difficulty in finding qualified men to fill vacant or newly created positions on their instructional staffs. As of June 1949 the medical schools reported that they had 240 unfilled full time positions in their preclinical departments and 201 in their clinical departments. The inability of the medical schools to fill about 10 per cent of the total number of full time positions that they have available is concrete illustration of the problem that faces the schools in attempting to increase their enrolments and maintain standards.

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## THE DEAN OF A MEDICAL COLLEGE—A JOB ANALYSIS

During the period 1945-1949 sixty-three new deans have been appointed by forty-five of the seventy-eight medical and basic science schools in the United States. This rapid turnover in deanships has aroused comment. The view has been advanced in some quarters that the task of heading a medical school has become so difficult and frustrating that few men are willing to cope with the problems for more than a short time. However, obvious explanations exist for most of the changes. The majority of new appointments have been necessitated by extramural or intramural promotions, by deaths and by retirements for age.

Evidence is available, however, to indicate that the demands made of deans are becoming heavier. In an increasing number of schools, the deanship is coming to be regarded as a full time job and the dean is not expected to carry major responsibilities in teaching, practice or research.

An adequate definition of the responsibilities of the dean reveals a formidable list of duties. The dean is the one person in the university and the medical school whose chief concern is the welfare of the medical school as a whole. Standing midway between the departments of the school and the university, the dean must provide the leadership in both the university and in the medical school that will enable the school to make its maximum contribution to education, to the advancement of knowledge and to the health of the community. To fulfil this role of leadership, the dean must be able to judge what constitutes good medical education, medical research and medical care. To this must be added a thorough knowledge of his own school and a critical evaluation of its resources. The dean is then prepared to work with the faculty in planning a program that will make maximum use of these resources without overtaxing them in an effort to meet all demands or to compete with other schools.

Once such a plan has been formulated, the dean must interpret to the university administration the school's needs and potentialities. Unless the dean is successful in gaining the university's support for a well defined program that meets both the immediate and long range needs of the school, the medical school has difficulty in progressing.

If the faculty has been carefully selected, the dean's responsibility in dealing with the individual departments may consist chiefly of promoting cooperation and of judiciously weighing their demands in relation to the needs of the school as a whole. In schools where the faculty is less capable, the dean must frequently seek to inspire, guide and encourage the individual departments to improve and develop their own programs in keeping with advancing ideas in medical education, research and community service. Leadership in planning the curriculum is an important responsibility of the dean. Most faculty members are intensely interested in the courses offered by their own departments. To the dean falls the difficult task of gaining the cooperation of all departments in keeping the entire curriculum continually abreast of changing values in medical science and medical education.

The authority resting in the deans for the selection of new faculty members varies. One of the most important responsibilities of the dean is to exercise all the authority he possesses so that the best available men are selected whenever new appointments are made.

The students look to the dean to help them acquire an understanding of their broad relations to the school, to the science of medicine and to the profession. The dean has the important responsibility of assisting in the development of standards for the selection of students. Further, it usually falls to the dean to see that the school retains its interest in the alumni so that the alumni will maintain their interest in the school.

The dean must be skilled in matters of finance. In several schools the budget which the dean administers exceeds a million dollars. In every school it amounts to several hundred thousand dollars. The dean not only must supervise the careful and economical spending of these funds but is usually expected to raise a substantial portion of the total. To their medical school responsibilities many deans must add the task of administering a large teaching hospital.

Several universities now have central departments that supervise the maintenance of the buildings and grounds, but in some schools the dean still counts the supervision of the janitors, the firemen and a small corps of mechanics among his direct responsibilities.

Much of the dean's time is spent in stimulating cooperation between the medical school and other departments of the university. Even more time is devoted to promoting and improving the school's relations with the general public, affiliated hospitals, philanthropic foundations, local, state and federal agencies of government and other organizations.

Most deans consult frequently with the local profession and with community health agencies to determine what contributions the medical school can make to their activities. Occasionally deans may not appear to be fully sympathetic with the problems of the profession. Incidentally, of the one hundred and three men who have been presidents of the American Medical Association at least thirteen served as deans.

The dean of a medical school must be an outstanding leader and be competent and skilled in many fields. Obviously, therefore, medical schools occasionally will experience difficulty in finding a suitable dean. The explanation of the growing fashion among universities to entrust their medical schools to vice presidents may, in part at least, lie in a feeling that it is easier to fill

a position which has not yet taken definite shape or meaning than to persist in seeking a man who can satisfactorily perform all the varied functions that have become so firmly attached to the deanship.

## GEOGRAPHIC RESTRICTIONS IN ADMISSION TO MEDICAL SCHOOLS

The report of the Council on Medical Education and Hospitals in this issue on the states or countries of origin of freshman medical students indicates that a number of medical schools, particularly those supported by states and municipalities, are limiting admissions more and more closely to residents of the state in which the schools are located. During the past year thirteen schools did not admit out-of-state students and five other schools admitted only one or two nonresidents. Only twenty-one schools admitted more nonresident than resident students.

In the last prewar year out-of-state students constituted 17.4 per cent of the freshman enrolments in the state and municipal schools. During the past academic year the percentage of nonresident students in the freshman classes of these schools was only 8.2 per cent. In the privately owned schools the percentages of out-of-state freshman students for these years were 52.9 per cent and 50.9 per cent, respectively.

While tax-supported institutions might well be expected to render service chiefly to the community that supports them, the exclusion of all nonresident students may not be a real service to the community. The practice definitely narrows the potential area from which a school may seek support. Students who attend such schools do not experience the stimulation and broadening influence of association with students who have different geographic and educational backgrounds. A most serious consequence of this policy is denial of admission to superior out-of-state applicants in favor of less well qualified residents. As a result the quality of the medical profession is lowered particularly in the states that follow such a short-sighted policy. The logical extension of this policy is exclusion from schools in other states of students from states in which medical schools exclude nonresidents. Again the ultimate effect is reduction of the quality of the medical profession in the states concerned.

If all medical schools could make available to well qualified out-of-state students between 10 and 20 per cent of the places in their entering classes, the community which supports them would be better served. The limitations already imposed on an appreciable number of schools and the expectation that the number of schools affected will increase rather than decrease make urgent action by the faculties, deans and presidents of the universities concerned toward persuading the governmental bodies to which they are responsible that a more liberal policy of admissions is in the best interest of the school and the community. Unless this problem can be solved satisfactorily at the local level, strong pressures will be applied at higher levels to dictate admission policies to the schools. Thus the bill for federal aid to medical schools now pending before the Senate provides, "No payments may be made to any school unless such school has filed an application therefor . . . which contains adequate assurance, as determined by the Surgeon General that such school provides and will provide reasonable opportunity for the admission of out-of-state students."

Medical schools and their parent universities have been practically unanimous in declaring that they do not want federal funds if such funds are to be accompanied with federal interference in the administration of the schools. Unless the responsible administrators of the medical schools can secure authority to adopt more liberal admission policies, the type of interference to which they are so strongly opposed will be sure to come.

## CONTINUING EVOLUTION OF THE INTERNSHIP AND RESIDENCY

The internship and residency are well established as essential parts of a physician's education. The development of recognition of the internship as essential dates back some forty years and that of the residency a little more than twenty years. The principles governing these types of training are still in a state of evolution. This issue of THE JOURNAL presents two statements of important changes that have recently taken place in the internship and in residency training.

The latest revision of the Council on Medical Education and Hospitals' "Essentials of an Approved Internship" is published in full in the report of the Council. These revised essentials were discussed in detail in an earlier number of THE JOURNAL.[1] A new and important feature of the essentials is the statement that the Council believes that a well organized rotating internship is likely to provide the best basic training for either the future general practitioner or the specialist. Prior to the development of residencies in the specialties, many recent graduates who intended to specialize selected "straight" internships because they provided the only opportunity for intensive hospital training in a specialty. Today practically every physician intending to specialize has residency training for two years or more in his chosen field. The prospective specialist need therefore no longer look to the internship as the primary opportunity for advanced training. On the contrary, in view of the prolonged and intensive period of training in a special field that is provided by the residency, many evident reasons appear for the broader type of experience provided by a rotating internship.

1. Editorial, J. A. M. A. 140: 226-227 (May 14) 1949.

A principal reason that the "straight" internship retains its popularity is that the intern moves from one service to another so rapidly in many rotating internships that he never has an opportunity to become sufficiently acquainted with the clinical problems or procedures on any one service. The Council has recognized this defect; in its new essentials the Council states that assignment to a service in a rotating internship should be for not less than two months. Furthermore, assignments to medicine and general surgery are each to be of three months' duration. Thus five services are the maximum through which an intern can be rotated in a twelve month period. These new standards should improve the quality of rotating internships and increase their popularity.

The other announcement of importance is that the American Board of Surgery will give credit for residency training obtained after July 1, 1950, only when such training has been received in hospitals offering graded residencies of three or four years' duration. This new regulation of the Board reflects the growing belief that residency training should be organized so that the resident is given increasing responsibility and greater opportunities for advanced study and research as he progresses in his training. Some hospitals have offered such programs for many years. Many physicians now meet the educational requirements of the specialty boards, nevertheless, by taking a year of training in each of several hospitals with unrelated programs, with the result that they frequently work at the same level of responsibility throughout their entire training period. In certain respects residency training has developed in a manner similar to that of undergraduate medical education in the period before the introduction of the graded curriculum when students repeated the same courses for two or three consecutive years.

Insistence on graded training will probably not be made by all the specialties immediately. The new policy of the American Board of Surgery points the way to an important avenue along which future progress will be made in the development of residency training.

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## FEDERAL AID TO MEDICAL EDUCATION

S. 1453, which provides for assistance for the education of professional and other health personnel, was reported favorably on Aug. 3, 1949, to the Senate by the Committee on Labor and Public Welfare. The Committee unanimously approved the bill. S. 1453 may be voted on by the Senate before it adjourns.

The bill provides for federal subsidies to medical schools of $500 for each student enrolled up to the school's average past enrolment and $1,000 for each additional student. The number of students for whom the higher rate of $1,000 will be paid must not exceed 30 per cent of the past average enrolment. However, new schools can receive $1,000 for each student. Total payments to a school cannot exceed 40 per cent of the school's budget. Osteopathic schools would receive aid similar to that for medical schools. These subsidies are not scholarships, and federal scholarships will not be awarded if the schools are able to fill their enrolments.

The bill provides $5,000,000 annually for grants for construction of new schools for the health professions and for the improvement and expansion of existing facilities. These grants would be made by the Surgeon General of the Public Health Service after the importance of the requests were estimated. Representatives of the American Medical Association who appeared before the Senate committee stated that these grants for construction should not be made until the needs of all medical schools had been surveyed and a long range program carefully developed.

The bill, as reported, provides for a National Council on Education for Health Professions. This council would consist of the Surgeon General and the Commissioner of Education or his representative, as nonvoting ex officio members, and ten members not otherwise in the full time employment of the federal government who would be appointed by the President. The ten members would be leaders in the fields of health, science, education and public affairs, and three of them would be persons active in professional health education. The council would advise, consult with and make recommendations to the Surgeon General on matters of general policy and administration. It also would report to Congress by Jan. 1, 1952, its recommendations for a long range program of federal aid based on its surveys of financial and related problems of education for the health professions.

Funds under this bill would be provided for five years except for scholarship funds, which would extend over eight years.

The legislative committee of the American Medical Association believes that this bill should be vigorously opposed as long as it includes appropriation of tax funds to support schools of osteopathy. The medical profession cannot support a federal program of subsidization which would encourage and aid in the further development of cultist practice. The principles governing diagnosis and treatment in the practice of osteopathy are not based on valid scientific observations. For the protection of the public against unestablished methods of diagnosis and treatment of disease, the medical profession, in accordance with its principles of ethics, should make every effort to eliminate federal support of schools of osteopathy, as provided in S. 1453.

# ORGANIZATION SECTION

## Official Notes

### AMA GROUP ARRIVES AT ANCHORAGE

A team of specialists sponsored by the American Medical Association held a refresher clinic at Anchorage, Alaska, July 19 to August 2. The course was sponsored by the American Medical Association, U. S. Air Force, and Alaska Native Service, Department of the Interior. The clinic was designed primarily for Alaska Native Service doctors, who are in charge of remote Alaskan hospitals. Also in attendance at the conference were medical officers stationed in Alaska with the U. S. Air Force and Army and personnel of the Alaska Department of Health.

The clinic marked the third year in which the AMA has cooperated with the Department of the Interior on Alaska's health problems. In previous years, clinics were held at all Alaska Native Service hospitals by AMA specialists. Members of the AMA teams have aided the Department of the Interior in obtaining Congressional funds for increased medical facilities in Alaska. A 200 bed tuberculosis sanatorium at

Arrival of the U. S. Air Force plane at Anchorage. Specialists were met by Brigadier General Frank Armstrong, Commanding General, Alaska Air Command, and Mayor T. J. Loussac of Anchorage. Left to right: Dr. George C. Turner, Dr. Edward Smith, Dr. Albert N. Lemoine Jr., Mayor Loussac, Brigadier General Armstrong, Dr. Milton Davis, Dr. Harry J. Isaacs and Dr. Elliott B. Hay.

Mount Edgecumbe is scheduled to open in January, and construction has started on a 400 bed hospital at Anchorage.

Recruitment of doctors and nurses to staff the new hospitals is under way. Requirements for Alaskan doctors in government service include: a degree from an accredited medical school, three years' medical practice, and United States citizenship. Annual salaries are approximately $7,200, and government housing is provided at nominal cost. Doctors or nurses interested in serving in Alaska are asked to write to the Alaska Native Service, Juneau, Alaska.

Specialists who volunteered to lecture at the Alaska Medical Mission conference were: Dr. Elliott Byron Hay, associate professor of surgery, Baylor University School of Medicine, Houston, Texas; Dr. Albert Lemoine Jr., associate professor of ophthalmology, University of Kansas, Kansas City; Dr. Edward H. Smith, associate professor of obstetrics, University of Oklahoma; Dr. George C. Turner, consultant, Chicago Municipal Tuberculosis Hospital; Dr. Milton Davis, anesthetist, Louisville General Hospital, Louisville, Ky., and Dr. Harry J. Isaacs of Chicago.

## Washington Letter

*(From Our Regular Correspondent)*

Aug. 29, 1949.

### Series of AMA-Press Discussions Opened

A number of leading commentators and columnists on the Washington scene participated in a round table discussion on American medicine in the national capital on August 22. It was the first in a series sponsored by the National Education Committee of AMA, to be conducted in various sections of the country. Taking part in the opening program were Dr. George Lull, Dr. Elmer L. Henderson, Dr. John Cline, Dr. Ralph J. Gampell, Clem Whitaker and Leone Baxter.

Rapid fire questioning of the medical panel by the approximately 30 writers in attendance elicited these points:

AMA recognizes the need of medical schools for financial aid but hopes that, if such assistance comes from federal sources, there will be no interference with beneficiaries' administrative or circular policies, schools of osteopathy will not be placed on the same eligibility level with schools of medicine and favoritism will not be shown newly established medical schools in allocation of funds.

The notion held in some quarters that the AMA is "anti-everything," as one of the questioners challenged, is "a fine myth" in the words of Dr. Lull. He pointed out that the Association has given its support to such major legislation as expansion of the Hill-Burton Hospital Act, federal aid to local public health units, support of medical education, strengthening of the World Health Organization and establishment of a national science foundation, among other bills.

First of a series of reports to the people on the nation's health is being prepared by AMA for release within a year and will cover costs of medical care, adequacy of hospital and clinic facilities, effectiveness of voluntary plans, distribution of physicians, medical education and the like.

Any investigation of lobbying that may be made by Congress will have the full cooperation of AMA and the firm of Whitaker & Baxter, which is conducting the present educational campaign.

Press reports of the round table discussion gave chief prominence to the disclosure by Mr. Whitaker that Department of Justice agents demanded to see records of the Chicago Medical Society last December, shortly after he and Miss Baxter were engaged to manage the educational campaign.

### Pay Raises for VA Doctors Passes House

Passed unanimously by the House on August 25 was a bill (HR 6022) increasing salary scales of physicians, dentists and nurses attached to the Department of Medicine and Surgery, Veterans Administration. The following bills were passed by the House at the same time: S. 2146, providing certain rehabilitation assistance for disabled veterans, and S. 2115, amending the act relative to furnishing of automobiles to disabled veterans.

### Bills Seek Conversion of VA Domiciliaries

Identical bills were introduced in House and Senate August 23 to convert to hospital status the domiciliary facilities operated by the Veterans Administration at Clinton, Iowa, and Medford, Ore. The proposed legislation is sponsored by Representative Talle (Iowa) and Senator Morse (Ore.) The institutions involved were Army hospitals in World War II.

# Medical News

(Physicians will confer a favor by sending for this department items of news of general interest: such as relate to society activities, new hospitals, education and public health. Programs should be received at least two weeks before the date of meeting.)

## CALIFORNIA

**Cancer Symposium.**—The early diagnosis and treatment of cancer in accessible sites with emphasis on diagnosis by general practitioners will be taken up at the Cancer Symposium September 24 at the Hotel California, San Francisco. The symposium is sponsored by the California Medical Association's Cancer Commission in cooperation with the California Division of the American Cancer Society.

**Personals.**—Dr. Herbert M. Evans, director of the Institute of Experimental Biology at the University of California, Berkeley, was lately given the highest award of the Association for the Study of Internal Secretions for "long-continued outstanding research which has notably advanced knowledge in the field of endocrinology, especially as regards the hormones of the anterior hypophysis."——The president of the Italian Republic has conferred on Dr. Jacob C. Geiger, director of public health, city and county of San Francisco, the Order of the Star of Italian Solidarity accompanied by the citation for "humanitarian activities for the Italian Republic and for the Italian citizens of San Francisco."

## CONNECTICUT

**Clinical Congress.**—The Clinical Congress of the Connecticut State Medical Society and Yale University School of Medicine, New Haven, will take place September 13-15. Morning sessions will be held in the auditorium of the Yale Law School, and afternoon panel discussions and symposiums in the amphitheaters of the New Haven Hospital and the School of Medicine. Out of state speakers at the morning sessions include:

Paul A. Davis, Akron, Ohio, The General Practitioner and His Relationship to the Hospital Staff.
Dickinson W. Richards Jr., New York, Pulmonary Function.
F. Sargent Cheever, Boston, Viruses and Rickettsiae.
Charles A. Doan, Columbus, Ohio, Hypersplenism.
John B. Alsever, Washington, D. C., Blood Banking.
Charles F. Geschickter, Washington, D. C., Use of Laboratory Procedures.
Frank L. Meleney, New York, Bacitracin.
Theodore E. Woodward, Baltimore, Chloromycetin.
Emanuel B. Schoenbach, Baltimore, Aureomycin.
Jonathan E. Rhoads, Philadelphia, Nutritional Requirements of the Surgical Patient.
Edgar V. Allen, Rochester, Minn., Anticoagulants.
Robert E. Gross, Boston, Coarctation of the Aorta.
John E. Howard, Baltimore, Role of Potassium in Medicine.
Maurice B. Strauss, Framingham, Mass., Medical Management of Lower Nephron Nephrosis.
Joseph H. Litz, Baltimore, Psychiatric Aspects of Hyperthyroidism.

## GEORGIA

**Personal.**—Dr. Thomas B. Phinizy, Augusta, has accepted an appointment as professor of public health at the University of Florida, Tallahassee. A graduate of the University of Georgia School of Medicine, Augusta, Dr. Phinizy for some years was health commissioner for Richmond County.

**Research on Venereal Disease.**—A grant of $7,700 for the continuation of a research project on venereal disease sponsored by the Emory University School of Medicine, Atlanta, Grady Memorial Hospital, Atlanta, and the Georgia Department of Health has been received from the National Institutes of Health, Washington, D. C. The funds will be used for continued evaluation of the methods of treating venereal disease. The project is under the direction of Dr. Albert Heyman, associate in medicine at the university.

## ILLINOIS

**Society News.**—The Peoria Medical Society on September 20 will hear Dr. John I. Brewer, Chicago, speak on "Pelvic Pain." At the October 18 meeting Dr. Milton G. Bohrod, Rochester, N. Y., will speak on "Pathology of the Allergic Diseases." Both meetings will be held at the University Club.

**Scientific Assembly on General Practice.**—The second annual scientific assembly of the Illinois Chapter, American Academy of General Practice, will be held October 9-10 at the Pere Marquette Hotel, Peoria. Among the speakers will be Dr. Andrew C. Ivy, "Psychosomatic Aspects of Gastric Ulcer"; Dr. Everett P. Coleman, Canton, "Tumors of the Thyroid"; Dr. Harold J. Wilson, Columbus, Ohio, "Undulant Fever"; Dr. Herman F. De Feo, Chicago, "Bedside Diagnosis of Cardiac Irregularities," and Dr. LeRoy H. Sloan, Chicago, "Correlation of Laboratory and Bedside Findings." All doctors and interns are invited to attend. For information and arrangements correspond with Dr. Peter H. Furno, 4124 West Madison Street, Chicago.

### Chicago

**Dr. Birch to Study in Africa.**—Dr. Carroll L. Birch, associate professor of medicine at the University of Illinois, has been granted a sabbatical leave of absence for a six month tour of Africa, where she will study African sleeping sickness and other tropical diseases. She will make her headquarters at Elat. She will travel with missionaries, Dr. and Mrs. George W. Thorne, and will make a tour of Presbyterian missions of Equitorial Africa. Dr. Birch plans to work primarily on the blood and bone marrow findings in African sleeping sickness.

**Research on the Betatron.**—The U. S. Public Health Service has awarded $15,000 to the University of Illinois College of Medicine in support of research studies involving the 22,000,000 volt betatron. The grant will be used specifically for the study of the effects of the betatron x-ray beam on bone and cartilage, under the supervision of Dr. Roger A. Harvey of the department of radiology and Dr. Granville A. Bennett of the department of pathology. Research studies have been conducted since its installation six months ago, and preparations are being made for the treatment of patients late in August.

**Personals.**—Dr. Raymond W. McNealy, associate professor of surgery, Northwestern University School of Medicine, in July presented two films in color on surgery of the wounds of the heart and technic for splenectomy before the Royal Academy of Medicine and Surgery of Barcelona.——Franklin C. Bing, Ph.D., director of the American Institute of Baking, Chicago, and formerly Secretary of the Council on Foods and Nutrition, American Medical Association, has resigned this position to devote full time to research and teaching in the field of foods and nutrition.

**University Research in Geriatrics.**—The Baptist Home and Hospital of Maywood has been granted an association with the University of Illinois College of Medicine. The service will be available for resident training. Dr. Sanford A. Franzblau, an instructor in internal medicine at the university, has been appointed medical director for the Baptist Home and Hospital. He said that a development program would be undertaken. Objectives include the installation of diagnostic laboratory facilities and the establishment of a complete system of medical records, the development of an up-to-date geriatrics nursing service under the supervision of registered nurses, the institution of special therapeutic diets suited to the needs of individual patients and the establishment of carefully controlled investigations into special problems of medical care in older persons. The Baptist Home and Hospital will provide for the personnel, laboratory facilities and special equipment needed to maintain a clinical service suitable for training on a university level and for the conduct of suitable research and investigation. The University of Illinois will supervise the clinical service and will approve and assist in the selection of professional and technical personnel. When indicated professional personnel will be given suitable academic appointments. The university also will assist in securing grants-in-aid for the support of research. The Baptist Home and Hospital, organized forty-three years ago, serves aged persons of Illinois, Indiana, Michigan and Wisconsin. It has a family of 150 members and more than 200 persons on its waiting list. Plans have been made to build a 150 bed hospital for the aged and chronically ill.

## KENTUCKY

**Venereal Disease Control Program.**—A venereal disease control project for all counties bordering on the Ohio River from Wheeling, W. Va., to Cincinnati has been mapped by health officials of Kentucky, Ohio and West Virginia. The program will be presented for approval to the U. S. Public Health Service, and a grant will be requested for nearly $70,000 of the total cost, which will be approximately $138,000. The official title of the proposed project is "Kentucky, Ohio and West Virginia Ohio Valley Case-Finding Demonstration," which is to operate from Jan. 1 to Dec. 31, 1950, with Ashland, Ky., as headquarters. The purpose of the study is to demonstrate the effectiveness of good interviewing and immediate investigation as an expedient in locating and bringing to treatment persons infected with syphilis. The three state health departments and two regional offices of the U. S. Public Health Service will cooperate on the project.

## MINNESOTA

**Appointed to Institute Staff.**—Dr. James F. Bosma, Minneapolis, assistant professor of pediatrics at University of Minnesota and Dr. Donald R. Lannin, St. Paul, clinical assistant at University of Minnesota Health Service, have become associated with the medical staff of the Elizabeth Kenny Institute in Minneapolis. Dr. Bosma is in charge of pediatrics and Dr. Lannin of orthopedic phases of care of poliomyelitis patients at the institute.

**Southern Minnesota Medical Association.**—The annual meeting of this association will be held in the Auditorium, Red Wing, September 12. Among the subjects to be discussed are the effect of cortisone and adrenocorticotropic hormone (ACTH) on rheumatoid arthritis, clinical use of aureomycin, urinary infections in children, pediatric surgery and polycythemia vera. Speakers at the banquet include Dr. Frank J. Elias, president elect, Minnesota State Medical Association; Dr. Lewis I. Younger, Winona, president of the association, and the Hon. Edward J. Thye, United States senator.

## NEW YORK

**Dr. Hobson Joins Squibbs Staff.**—Dr. Lawrence B. Hobson, New York, has been appointed associate medical director of E. R. Squibb & Sons. He will continue his work in clinical investigation as a member of the staff of the New York Hospital-Cornell Medical Department, where he has been for the past year a postdoctorate fellow of the National Institutes of Health. Dr. Hobson obtained his Ph.D. at the University of Cincinnati and his M.D. degree at the University of Chicago in 1943. During the war he was chief of Section, Medical Research Laboratory, Edgewood Arsenal, with the rank of captain. Subsequently, he has acted as medical consultant to the Veteran's Administration.

### New York City

**Dedicate Tuberculosis Unit.**—A completely isolated tuberculosis unit has been established at Manhattan General Hospital for the care of 150 patients to relieve the shortage of beds for the treatment of that disease in city institutions. Dedication ceremonies took place at the hospital June 16. According to Dr. Marcus D. Kogel, New York City commissioner of hospitals, it is the first time in hospital history that a private nonvoluntary hospital has accepted city patients. The unit of the sixth floor in the 500 bed hospital has been in operation since February. Dr. James S. Edlin, medical director of the Municipal Sanatorium of the City of New York, Otisville, is medical director of the new unit. The surgical division is headed by Dr. Samuel A. Thompson, who is also surgical director of the Municipal Sanatorium in Otisville.

## PENNSYLVANIA

**State Medical Meeting.**—The Medical Society of the State of Pennsylvania will hold its annual session September 25-29 with headquarters at the Hotel William Penn, Pittsburgh. The program, organized by symposiums, includes the following guest physician speakers:

Silas M. Evans, Milwaukee, Pathogenesis of Silicosis.
Walter Kempner, Durham, N. C., Treatment of Heart and Kidney Disease and of Hypertensive and Arteriosclerotic Vascular Disease with the Rice Diet.
Arthur R. Colwell, Chicago, Types of Diabetes Mellitus and Their Treatment.
Fletcher D. Woodward, Charlottesville, Va., Medical Criticism of Modern Automotive Engineering.
Wolf W. Zuelzer, Detroit, Anemias of Infancy and Childhood.
John D. Stewart, Buffalo, Surgical Aspects of Peptic Ulcer.
Louis Schwartz, Washington, D. C., Dermatitis and Fabrics.
Donald A. Covalt, New York, Rehabilitation.
Charles A. Gordon, Brooklyn, Obstetric Hemorrhage—Cesarean Section.
John H. Peters, Pittsburgh, Some Aspects of the Relation of Cholesterol to Vascular Disease.
Orvar Swenson, Boston, Etiology and Treatment of Hirschsprung's Disease.
Louis J. Karnosh, Cleveland, Problem of Neuritis.
Lloyd G. Lewis, Washington, D. C., Testis Tumors.
David J. Sandweiss, Detroit, Present Status of the Treatment of Duodenal Ulcer.
Emanuel M. Papper, New York, Evaluation of Analgesics.
Perrin H. Long, Baltimore, A Future for Preventive Medicine.
George T. Pack, New York, Carcinoma of the Stomach.
Stewart H. Clifford, Boston, Infections of the Newborn and Premature Infant.

Technical and scientific exhibits will be shown. The Woman's Auxiliary will hold its meeting at the Roosevelt Hotel.

## WASHINGTON

**Professor of Graduate Medicine.**—Dr. Roscoe L. Pullen, Seattle, has been appointed professor of graduate medicine, director of the Division of Graduate Medicine and vice dean of the Tulane University of Louisiana School of Medicine, New Orleans, effective October 1. Dr. Pullen has been an associate professor of medicine and director of hospital planning at the University of Washington, Seattle, since 1947 and is a consultant in internal medicine for the Madigan General Hospital in Tacoma. He had served as an instructor in medicine at Tulane University from 1943 to 1946.

**State Medical Meeting.**—The Washington State Medical Association will hold its annual convention at the Olympic Hotel, Seattle, September 11-14. Guest speakers include:

Robert J. Crossen, St. Louis, Role of the Gynecologist in Prevention of Uterine Cancer.
Edith Potter, Chicago, Life Cycle of Normal Ovary.
Leland S. McKittrick, Boston, Transmetatarsal Amputation.
John A. Anderson, San Francisco, Diagnosis of Poliomyelitis.
John W. Oliphant, Hamilton, Mont., Use of Antibiotics in Treatment of Rickettsial Diseases.

At the dinner September 11 Dr. Ernest E. Irons, President, and George F. Lull, Secretary and General Manager, American Medical Association, Chicago, will speak. The Woman's Auxiliary will meet in conjunction with the state association.

## GENERAL

**Iodine Abstracts and Reviews.**—A new bimonthly periodical, *Iodine Abstracts and Reviews*, is being prepared by the Iodine Fellowship at Mellon Institute, Pittsburgh 13, Pa., to provide summaries of scientific and technical literature relating to the uses of iodine and its compounds in chemistry and industry. From time to time it will present reviews of specific phases of the science and technology of iodine. Complimentary subscriptions may be secured by addressing the Iodine Educational Bureau, Inc., 120 Broadway, New York 5, N. Y.

**Personals.**—Dr. Robert P. Poole Jr. of the department of pediatrics and Dr. Paul G. Fillmore, assistant resident in medicine, Duke University School of Medicine, Durham, N. C., have been assigned to the laboratory of the Atomic Bomb Casualty Committee Commission for service in Japan. The doctors will work with other American and Japanese physicians in the care and treatment of those injured in the atomic blasts in Hiroshima and Nagasaki. They will serve two years.

**Insurance Medical Directors Meeting.**—The annual meeting of the Association of Life Insurance Medical Directors of America will convene October 13-14 at the Hotel Statler, New York, under the presidency of Dr. Edwin G. Dewis. The following program has been arranged:

William S. Middleton, Madison, Rickettsial Diseases in the United States.
Alan D. Smith, New York, Low Back Pain.
Paul R. Hawley, Chicago, Voluntary Health Insurance.
Cornelius P. Rhoads, New York, Cancer.
Walsh McDermott, New York, Antibiotics.
Robert E. Gross, Boston, Surgical Treatment for Coarctation of the Aorta.
O. H. Perry Pepper, Philadelphia, Medical Follow-up of Veterans.
Cecil C. Birchard, Montreal, Arterial Hypertension.

**International Conference on Venereal Disease.**—The twenty-sixth general assembly of the International Union Against Venereal Disease will be held in Rome September 12-16 under the patronage of Dr. Cotelessa, High Commissioner for Hygiene and Public Health of the Italian Republic, and with the assistance of the Italian committee. The inaugural meeting will take place at the Capitole and the working sessions will be at the Instituti Fisioterapici Ospitalieri, 295 Viale Regina Margherita. Papers to be presented include:

Study on Distribution and Causes of Accidents Provoked by Antivenereal Arsenical Drugs, Prof. F. Flarer, Italy.
Results of Simple and Multiple Treatment of Primary Syphilis with Procaine Penicillin in Oil with Aluminum Monostearate, Drs. Delmos K. Kitchen, E. W. Thomas and Charles R. Rein, United States.
Study of Problem of Syphilitic Heredity, from the Medical and Social Points of View, Dr. Gerard, Belgium; Dr. Brun-Pedersen, Denmark, and Mrs. Neville-Rolfe, Great Britain.
Study of Prostitution, Dr. W. Clarke, United States, and Dr. R. Lavoine, France.
Prostitution in Morocco, Dr. Sicault and Lepinay, Morocco.
Study of Antivenereal Campaign in Italy, Professor Tommasi and Professor Canaperia, Italy.
Antivenereal Organization of the Inland Navigation on the River Rhine in Collaboration with the World Health Organization, Professor Pautrier, France.
Visual Methods of Popular Antivenereal Education in France, Mr. L. Vihorel, France.

For further information address the Secretary of the Organization of the Congress of the International Union Against Venereal Disease, Viale Regina Margherita 295, Institute, Fisioterapici Ospitalieri, Rome, Italy.

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**Prevalence of Poliomyelitis.**—Reports of cases of poliomyelitis for the periods indicated have been received from the National Office of Vital Statistics, U. S. Public Health Service.

| Division and State | Week Ended | | | Jan. 1 to | | Total * | |
|---|---|---|---|---|---|---|---|
| | Aug. 20, 1949 | Aug. 21, 1948 | Median Expect. | Aug. 20, 1949 | Aug. 21, 1948 | March 19-Aug. 20, 1949 | March 20-Aug. 21, 1948 |
| **New England States:** | | | | | | | |
| Maine | 40 | 4 | 2 | 180 | 10 | 180 | 10 |
| New Hampshire | 15 | 1 | 1 | 37 | 7 | 37 | 7 |
| Vermont | 16 | 3 | 2 | 221 | 8 | 30 | 7 |
| Massachusetts | 189 | 19 | 19 | 543 | 65 | 543 | 62 |
| Rhode Island | 14 | .. | .. | 35 | .. | 35 | .. |
| Connecticut | 39 | 6 | 9 | 165 | 46 | 162 | 45 |
| **Middle Atlantic States:** | | | | | | | |
| New York | 691 | 99 | 99 | 2,892 | 413 | 1,982 | 377 |
| New Jersey | 129 | 40 | 24 | 444 | 215 | 408 | 208 |
| Pennsylvania | 69 | 43 | 43 | 304 | 213 | 194 | 202 |
| **East North Central States:** | | | | | | | |
| Ohio | 209 | 82 | 48 | 598 | 288 | 592 | 280 |
| Indiana | 70 | 17 | 17 | 565 | 128 | 556 | 128 |
| Illinois | 348 | 66 | 66 | 1,246 | 256 | 1,230 | 260 |
| Michigan | 330 | 42 | 42 | 1,059† | 168 | 1,048 | 162 |
| Wisconsin | 78 | 36 | 11 | 334 | 170 | 330 | 170 |
| **West North Central States:** | | | | | | | |
| Minnesota | 156 | 67 | 28 | 728 | 278 | 660 | 270 |
| Iowa | 114 | 37 | 15 | 487 | 271 | 474 | 258 |
| Missouri | 103 | 17 | 10 | 701 | 85 | 690 | 85 |
| North Dakota | 32 | 4 | 4 | 229 | 32 | 235 | 32 |
| South Dakota | 25 | 6 | .. | 141 | 62 | 119 | 62 |
| Nebraska | 41 | 39 | 10 | 205 | 224 | 192 | 219 |
| Kansas | 55 | 10 | 7 | 362 | 92 | 326 | 89 |
| **South Atlantic States:** | | | | | | | |
| Delaware | 7 | 8 | 4 | 25 | 85 | 23 | 84 |
| Maryland | 10 | 7 | 7 | 58 | 22 | 49 | 21 |
| District of Columbia | 9 | 6 | 6 | 34 | 37 | 33 | 37 |
| Virginia | 21 | 29 | 25 | 129 | 228 | 119 | 228 |
| West Virginia | 29 | 7 | 9 | 186 | 67 | 179 | 54 |
| North Carolina | 14 | 159 | 7 | 137 | 1,626 | 110 | 1,602 |
| South Carolina | 2 | 36 | 1 | 55 | 207 | 42 | 199 |
| Georgia | 5 | 8 | 4 | 94 | 120 | 86 | 119 |
| Florida | 11 | 14 | 8 | 135 | 139 | 114 | 147 |
| **East South Central States:** | | | | | | | |
| Kentucky | 42 | 16 | 6 | 260 | 100 | 252 | 97 |
| Tennessee | 41 | 28 | 10 | 272 | 164 | 266 | 157 |
| Alabama | 6 | 6 | 7 | 1349 | 101 | 121 | 89 |
| Mississippi | 18 | 7 | 6 | 195 | 70 | 184 | 68 |
| **West South Central States:** | | | | | | | |
| Arkansas | 55 | 10 | 9 | 660 | 78 | 658 | 77 |
| Louisiana | 6 | 5 | 5 | 135 | 68 | 123 | 69 |
| Oklahoma | 71 | 25 | 18 | 759 | 195 | 752 | 189 |
| Texas | 104 | 54 | 49 | 1,527 | 1,185 | 1,446 | 1,164 |
| **Mountain States:** | | | | | | | |
| Montana | 2 | .. | 3 | 23 | 25 | 22 | 15 |
| Idaho | 33 | 4 | 3 | 226 | 78 | 223 | 31 |
| Wyoming | 14 | 10 | 3 | 52 | 45 | 52 | 45 |
| Colorado | 60 | 7 | 7 | 220 | 40 | 218 | 38 |
| New Mexico | 7 | 4 | .. | 78 | 38 | 77 | 36 |
| Arizona | 20 | 11 | 3 | 82 | 47 | 71 | 46 |
| Utah | 11 | .. | 2 | 79 | 30 | 63 | 27 |
| Nevada | .. | .. | .. | 10 | 2 | 10 | 1 |
| **Pacific States:** | | | | | | | |
| Washington | 29 | 3 | 15 | 210 | 96 | 165 | 78 |
| Oregon | 7 | 6 | 6 | 92 | 55 | 60 | 39 |
| California | 115 | 206 | 28 | 1,128 | 1,651 | 839 | 1,619 |
| **Total** | 3,422 | 1,313 | ..... | 17,360† | 9,743 | 16,290 | 9,286 |
| Median, 1944-1948 | | | 1,254 | 6,362 | | 5,909 | |

* Last two columns show reported incidence since approximate average seasonal low: 22 weeks.

† Corrections: Alabama: deduct 4 cases, not allocated to specific weeks. Michigan: deductions weeks ended January 8, 1 case; January 22, 4 cases; January 29, 1 case; February 19, 1 case; April 16, 1 case; July 9, 1 case; July 30, 3 cases; August 6, 1 case. Add, July 2, 2 cases. Vermont: deduct 1 case week ended July 23.

**Course on Placement of the Handicapped.**—To help meet the employment problems of the severely handicapped, a training course for employment and placement of counselors will be held November 7-December 7 in New York under the joint sponsorship of Alpha Gamma Delta, international women's fraternity, and the National Society for Crippled Children and Adults. The course, to be held at the Institute of Rehabilitation and Physical Medicine, Bellevue Hospital, New York, will be under the auspices of the New York University School of Medicine. Six hours of graduate academic credit will be offered by the School of Education. Fifteen to twenty fellowships for the course, amounting to $350 each, including tuition and maintenance, will be awarded through a grant by Alpha Gamma Delta. The fraternity provided a grant for a similar course held last spring. The course is part of the national cerebral palsy program of the National Society for Crippled Children and Adults, started three and a half years ago to develop a nationwide program for the cerebral palsied. Counselors from these agencies, as well as schools and industries, will be selected according to their qualifications and the contributions they can make. Counselors will visit rehabilitation and treatment centers to obtain first hand knowledge of the problems involved, make case studies and evaluations, study the psychosocial and medical aspects and hear lectures on job analysis, occupational information, psychology of the handicapped, agency interrelationships and other pertinent subjects. The first three days of the course will be spent in attendance at the annual nationwide convention of the National Society for Crippled Children and Adults, November 7-9, at the Hotel Commodore in New York. Information may be obtained from the National Personnel Registry and Employment Service of the National Society for Crippled Children and Adults, 11 South LaSalle Street, Chicago 3, Ill. Applications will be accepted until September 15, and trainees selected will be announced about October 15.

## CANADA

**Courses in Diagnosis of Uterine Cancer.**—McGill University Faculty of Medicine, Montreal, is offering courses in clinical cytology for diagnosis of uterine cancer. A two weeks' course in individual instruction for cytologic technics and interpretation will be given November 7-21. The tuition is $100. A four week course will be given continuously for technicians to teach cytologic methods and technics, and a six to twelve months' course in cytologic interpretation.

## FOREIGN

**Named Foundation Director.**—Fondazione Mario Donati of Milan, Italy, has chosen Prof. Carlo Foa, director of the Physiology Institute of Milan University, as president of the university succeeding the late Prof. Emilio Alfieri.

**International Congress of Cardiology.**—The first International Congress of Cardiology will take place in Paris Sept. 3-9, 1950. Persons planning to attend are asked to notify the secretary-general, Dr. Mouquin, 78, Rue de l'Abbé-Groult, Paris 15e, France, before Oct. 1, 1949. The registration fee is $20 (6,000 French francs) and $10 for the wives of congress members.

**Advanced Course in Rheumatic Diseases.**—Dr. F. Coste, professor of rheumatology at the Faculty of Medicine in Paris, assisted by Dr. R. Merle d'Aubigné, professor of orthopedic surgery, will give an advanced course on rheumatic diseases and diseases of the bones at the Hôpital Cochin in Paris October 3-November 12. The course is divided into two sessions: (1) rheumatic diseases (October) and (2) diseases of the bones. Lectures will be given in the afternoon at the Hôpital Cochin in the Amphitheatre Widal. Clinical and practical teaching will take place in the morning in the wards, supervised by Professor Coste and Professor Merle d'Aubigné, Hôpital Cochin; Prof. S. de Sèze, Hôpital Lariboisiere; Dr. Layani, Hotel Dieu, and Dr. Lièvre, Hôpital Tenon. Tuition fees are 3,000 francs ($10) for the session on rheumatic diseases and 1,200 francs ($4) for the session on diseases of the bones. An attendance certificate will be issued to all who complete the course. For further particulars write to Dr. P. Gaimiche, Hôpital Cochin, Pavillon Hardy, 27 Rue du Faubourg St. Jacques, Paris (14e), France.

## CORRECTION

**Markle Scholars in Medical Science Nominations.**—The John and Mary R. Markle Foundation is making grants of $25,000 payable at the rate of $5,000 annually to schools over a five year period for the support of each scholar selected, not $250,000 at the rate of $5,000 annually as was stated in THE JOURNAL August 13, page 1220.

# Marriages

ERNEST GODDALL EDWARDS JR., Columbia, S. C., to Miss Dorothea Pauline Halloran of Boston, in New Haven, Conn., July 9.

ROBERT STEVENSON LACKEY, Lenoir, N. C., to Miss Julia Winchell in Germantown, Pa., July 2.

PETER J. DULLIGAN JR., Brooklyn, to Miss Mary Norine Manion of Oil City, Pa., July 2.

PAUL FRANCKE JR., Chicago, to Miss Ardath Stanton of Greenwood, Miss., July 1.

RACHEL CARLETON SPARKS to Mr. E. B. Keeton, both of Portland, Ore., July 20.

## Deaths

**Thomas Reuben Keller Gruber** ● Eloise, Mich.; born in Navarre, Ohio, July 4, 1887; Western Reserve University School of Medicine, Cleveland, 1912; member of the House of Delegates of the American Medical Association from 1937 to 1949; served with the American Expeditionary Forces in France during World War I; specialist certified by the American Board of Psychiatry and Neurology, Inc.; fellow of the American Psychiatric Association; served as president and treasurer of the Wayne County Medical Society; member of the American College of Hospital Administrators, Michigan Hospital Association and American Hospital Association; served as president of the Health Council of Metropolitan Detroit; formerly superintendent of Receiving Hospital, Detroit; superintendent of the Wayne County Hospital and Infirmary; died August 7, aged 62, of coronary thrombosis.

**Walter Edward Doyle** ● medical director, U. S. Public Health Service, Hot Springs National Park, Ark.; born in Canandaigua, N. Y., Oct. 7, 1895; University of Buffalo School of Medicine, 1921; entered the public health service on July 18, 1942; served as director of the state bureau of industrial hygiene, Kentucky State Department of Health in Louisville, and as chief of the medical unit, industrial hygiene division, Bureau of State Services, U. S. Public Health Service; affiliated with the cancer investigation unit of the U. S. Public Health Service Medical Center; died in the Army and Navy General Hospital April 11, aged 53, of pulmonary edema, hypertension and coronary thrombosis.

**Moses Akin,** Ellenville, N. Y.; Tufts College Medical School, Boston, 1925; member of the American Medical Association; served as health officer and school physician; affiliated with the Veterans Memorial Hospital; died July 11, aged 62, of coronary disease.

**Mortimer Leonard Alexander,** Kansas City, Mo.; Louisville (Ky.) Medical College, 1893; died July 5, aged 89.

**Harold Musgrave Allen** ● Lawrence, Mass.; Tufts College Medical School, Boston, 1913; served overseas during World War I; on the staff of Lawrence General Hospital; died in Baker Hospital, Boston, July 3, aged 58.

**Calmes Pearson Bishop** ● Frederick, Colo.; University of Oklahoma School of Medicine, Oklahoma City, 1937; member of the Oklahoma State Medical Association; served during World War II; died June 25, aged 37.

**William James Carey** ● Philadelphia; Hahnemann Medical College and Hospital of Philadelphia, 1936; served during World War II; died July 1, aged 38, of injuries received in an automobile accident.

**John Russell Carty** ● Forest Hills, N. Y.; Cornell University Medical College, New York, 1921; formerly on the faculty of his alma mater; served during World War I; member of the American Roentgen Ray Society, Radiological Society of North America and the American College of Radiology; specialist certified by the American Board of Radiology; served on the staff of New York Hospital; died in the Addison Gilbert Memorial Hospital, Gloucester, Mass., July 12, aged 56, of hemiplegia, cerebral hemorrhage and arteriosclerosis.

**Leon Sidney Eagleburger,** Stevens Point, Wis.; Rush Medical College, Chicago, 1930; member of the American Medical Association; served during World War II; affiliated with St. Michael's Hospital; died June 18, aged 53, following an automobile accident.

**David Donald Feld,** Spivak, Colo.; Marquette University School of Medicine, Milwaukee, 1932; member of the American Trudeau Society and fellow of the American College of Chest Physicians; at one time affiliated with Santa Barbara (Calif.) General Hospital and Los Angeles Sanatorium in Duarte; medical director of the Sanatorium of the Jewish Consumptives Relief Society; died July 2, aged 43, of coronary insufficiency and myocarditis.

**Francis Joseph Stanislaus Fitzgerald,** Brooklyn; Long Island College Hospital, Brooklyn, 1897; member of the American Medical Association; served on the staff of St. Mary's Hospital; died in July, aged 74, of coronary occlusion.

**Ethel Friedmann Gaal,** Chicago; Magyar Kiralyi Erzsebet Tudomanyegyetem Orvostudomanyi, Pecs, Hungary, 1923; died July 13, aged 51, of coronary thrombosis.

**Russell Diener Geary** ● Riverside, N. J.; Hahnemann Medical College and Hospital of Philadelphia, 1924; clinical professor of broncho-esophagology at his alma mater; specialist certified by the American Board of Otolaryngology; affiliated with the Broad Street, Hahnemann, St. Luke's and Children's hospitals in Philadelphia, William McKinley Memorial Hospital in Trenton and Zurbrugg Memorial Hospital; died July 3, aged 50, of meningeal sarcoma.

**Allan Victor Gilliland** ● Smyrna, Del.; University of Western Ontario Medical School, London, Ontario, Canada, 1926; formerly secretary of the Medical Society of Delaware; died June 29, aged 48.

**James C. Grady,** Kenly, N. C.; Baltimore University School of Medicine, 1887; member of the American Medical Association; died July 3, aged 85.

**Robert Elliott Graves** ● Chicago; the Hahnemann Medical College and Hospital, Chicago, 1904; Rush Medical College, Chicago, 1907; served during World War I; died July 2, aged 72, of pulmonary tuberculosis and uremia.

**David Graham Hall,** Dallas, Texas; Harvard Medical School, Boston, 1879; died June 28, aged 91, of lobar pneumonia.

**William Benjamin Hanelin,** Chicago; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1906; veteran of the Spanish-American War; formerly on the staff of the American Hospital, where he died July 23, aged 70, of coronary thrombosis.

**Lawrence A. Hick,** Delta, Colo.; Omaha Medical College, 1895; member of the American Medical Association; served as a member of the board of directors of the Delta Savings and Building Association for many years; on the staff of Delta Memorial Hospital; died June 25, aged 80, of chronic myelogenous leukemia.

**Andrew J. Hill,** Chicago; Jenner Medical College, Chicago, 1911; died in Provident Hospital July 7, aged 73, of paralysis agitans.

**Luther Albion Hodsdon** ● Miami, Fla.; Tufts College Medical School, Boston, 1898; affiliated with Dade County Hospital; died July 9, aged 72, of cerebral thrombosis.

**Orval Nathan Hooker,** Amarillo, Texas; Tulane University of Louisiana School of Medicine, New Orleans, 1940; member of the American Medical Association; served during World War II; affiliated with St. Anthony's and Northwest Texas hospitals; died July 5, aged 33.

**Robert A. Howell,** Gallipolis, Ohio; Medical College of Ohio, Cincinnati, 1895; also an attorney; died June 1, aged 86.

**Ira Butler Hull,** Newmarket, N. H.; Harvard Medical School, Boston, 1912; member of the American Medical Association and the Massachusetts Medical Society; formerly member of the school board and for many years medical examiner for the Gloucester (Mass.) area; served on the staff of Addison Gilbert Hospital, Gloucester, Mass., where he died July 9, aged 67, of hypertension and nephritis.

**Samuel Jerome Hurwitt** ● San Francisco; University of Kansas School of Medicine, Kansas City, 1921; member of the American College of Chest Physicians and the American Trudeau Society; died June 5, aged 55, of carcinoma of the bladder.

**John Felix Jenkins Sr.,** Birmingham, Ala.; Medical College of Alabama, Mobile, 1901; member of the American Medical Association; served during World War I; died July 3, aged 74.

**Frank Le Baron Jenney,** Lakeside, Mich.; College of Physicians and Surgeons of Chicago, 1890; formerly medical director of the Federal Life Insurance Company in Chicago; died July 3, aged 79, of arteriosclerosis.

**Albert Johnson,** Washington, D. C.; Howard University College of Medicine, Washington, 1892; died July 1, aged 81, of chronic myocarditis.

**William Reid Johnson** ● Syracuse, N. Y.; Syracuse University College of Medicine, 1930; served during World War II; died July 14, aged 42, of acute coronary thrombosis.

**John Morgan Jones** ● Oakland, N. J.; Vanderbilt University School of Medicine, Nashville, Tenn., 1899; served during World War I; affiliated with Christ Hospital in Jersey City; died July 10, aged 72, of heart failure.

**Thomas Melville Proctor,** Wrentham, Mass.; Harvard Medical School, Boston, 1905; served during World War I; died in Boston, June 8, aged 72, of pulmonary embolus, arteriosclerotic heart disease and myocardial infarction.

**John Jay Russell,** Deepwater, Mo.; University Medical College of Kansas City, 1889; member of the American Medical Association; died in the Clinton (Mo.) General Hospital June 2, aged 88.

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# Correspondence

## POLLINOSIS IN SOUTHERN CALIFORNIA

*To the Editor:*—In Queries and Minor Notes in THE JOURNAL of Sept. 11, 1948, page 167, under the heading "Allergy and Myopia," a New York physician inquires "What are the best areas in California for patients with hay fever and allergy?" Your consultant answers "California is practically free from ragweed. Therefore, patients who are sensitive to ragweed will almost certainly be free of symptoms in any part of that state."

In a subsequent issue, Shure and Harris (Allergy and Myopia, J. A. M. A. **139**: 554 [Feb. 19] 1949) reply that (1) the statement that patients who are sensitive to ragweed will almost certainly be free of symptoms in any part of this state is misleading, since the Western ragweed that grows here is antigenically related to short and giant ragweed, and (2) a patient moving to this area from the East will probably substitute an allergy to plants with prolonged seasons of pollination in place of an allergy to plants with short pollinating seasons.

While it is highly commendable for Shure and Harris to call attention to the fact that pollen sensitivity exists here as elsewhere, their brief communication may be equally misleading in the opposite sense, in the implication that there can be no advantage to be gained by patients with pollinosis by their moving to Southern California. In view of the reputation which this part of the country has for "climate" and in view of the thousands of patients who are annually referred here to partake of the advantages of this climate, further elaboration is desirable.

The belief that ragweed hay fever is practically nonexistent in this area is indeed prevalent in some quarters and appears to be based on the following mistaken notions held in both medical and lay circles:

1. Ragweed is not present in Southern California. At present this holds true for short ragweed (Ambrosia elatior) and giant ragweed (Ambrosia trifida), but not for other members of the ragweed tribe. The native flora here includes western ragweed (Ambrosia psilostachya) and various representatives of the false ragweeds (genus Franseria), the marsh elders (genus Iva) and the cockleburs (genus Xanthium), to name some of the more familiarly known plant groups.

2. Each species of ragweed has an antigen peculiar to itself, and, since short and giant ragweed are not found here, patients subject to ragweed allergy east of the Rockies may escape their difficulty by coming to California.

The weight of evidence does not support this concept of "species-specificity" among pollen antigens. Limitation of space prevents the marshalling of available evidence from the literature on this point, but suffice it to say that Blackley as far back as the last century noted that among the grasses there appears to be a widespread sharing of a common antigen beyond the boundaries of the genus, and with respect to the ragweeds it has been known for some time that the antigen in both short and giant ragweed is identical. The work of Prince and Secrest (*J. Allergy* **10**: 537, 1939) indicated that the same antigen is present also in western ragweed (but that burweed marsh elder has a different antigenic pattern). My own work (unpublished data) has led me to the conclusion that the identical antigen or antigenic mixture which is found in short and giant ragweed is present not only in all species of Ambrosia but also in all species of Franseria. This was pointed out by me in 1946 (Letters of the International Correspondence Society of Allergists, s. 10, 1946, p. 26), at which time I stated, "I have not been able to detect any antigenic differences between the various species of *Ambrosia* or *Franseria* so that eastern patients sensitive to *Ambrosia elatior* or *trifida* are also sensitive to *Ambrosia psilostachya* and to the Franserias."

It follows from this that a person cannot as a rule hope to escape the plant antigen to which he is sensitive by migrating to a part of the country where species (or genera) of his original environment may be absent but where related species (or genera) are present. Nevertheless, this does not mean that one cannot by such a move effect a change for the better. The answer to the problem is determined basically by the amount of atmospheric pollen the person will encounter in this or that area.

Durham has devoted years of effort to securing data from all parts of the country regarding the seasonal incidence of ragweed pollen. A report by him (Pollen Studies in Selected Areas, J. A. M. A. **104**: 1486 [April 27] 1935) reveals clearly the differences in ragweed pollen incidence as between Southern California and other areas. A total count averaging about 100 for the entire fall season here is in sharp contrast to counts as high as 3,000 and more in the Midwest; or, to place the comparison on a daily basis from my own personal experience, counts running into the hundreds at the height of the season in the Chicago area may be contrasted with daily counts here which do not exceed 5.

These comparative figures indicate that ragweed sufferers in the Midwest may expect measurable relief in this area, and this is borne out by clinical experience. When a patient's sensitivity is pitched at such a level that residence in a high count area is marked by incapacitating asthma and rhinitis, whereas residence in a low count area calls forth nasal and chest symptoms that are tolerable or minimal, the length of the pollinating season in the low count area becomes of little importance.

I have dwelt at length on ragweed because of its clinical importance, because of the misconceptions regarding its occurrence and significance here and because comparative data with respect to ragweed pollen incidence have long been available through Durham's work. Until recently it was not possible to make similar comparisons for other pollens in this area, except for the fall months, because no such data was available. To correct this situation I have recently published a pollen survey (*Ann. Allergy* **6**: 645, 1948) covering all months of the year for the Los Angeles area. The survey reveals that, though the pollinating seasons here are longer, the counts for most of the pollens of major clinical importance are in general notably lower than those reported from areas east of the Rockies. This does not mean that pollinosis is almost nonexistent here. The prevalence of clinical pollen allergy in this area has been pointed out more than once (Piness, G.: J. A. M. A. **84**: 584, 1925. Stealy, C. L.: *J. Lab. & Clin. Med.* **22**: 273, 1936. Targow, A. M.: *Ann. Allergy* **6**: 645, 1948). It is evident that, though the counts here are low in contrast to counts elsewhere, the air-borne pollen density is nevertheless sufficient to induce sensitization. But, as stated, for the majority of cases the intensity of the resulting symptoms does not approach that which prevails in high count areas.

One may conclude, therefore, that when plant pollens present themselves as the only offenders in instances of clinical allergy this may indeed be a better climate for patients to move to. Unfortunately, plant pollens are not always the only factors involved, and when multiple sensitivity exists the situation may be entirely reversed. Newly arrived patients sensitive to house dust, for example, not infrequently find their symptoms to be much worse here than elsewhere. Similarly, other factors may so overshadow the pollen factor as to render useless any change of residence.

The fact that Southern California is not to be considered a Utopia for all cases of allergy cannot be too strongly emphasized

in view of the readiness with which Eastern physicians ship their problem patients here, hoping for a miraculous improvement. Too often no such improvement takes place, and not infrequently the patient gets worse.

A. M. TARGOW, PH.D., M.D.,
University of Southern California School of Medicine, Los Angeles.

## Council on Medical Education and Hospitals

### APPROVAL OF THE BOARD OF THORACIC SURGERY

During the past year the Board of Thoracic Surgery was organized as a subsidiary board of the American Board of Surgery. It has been officially approved by the Advisory Board for Medical Specialties and by the Council on Medical Education and Hospitals of the American Medical Association. The board is the nineteenth examining board in the specialties to be approved by the Council.

Certification by the American Board of Surgery is a prerequisite for certification by the Board of Thoracic Surgery. The board has awarded 174 Founder Member certificates since its organization. The first examination by the board was given Aug. 1, 1949.

The chairman of the Board of Thoracic Surgery is Dr. Carl Eggers, New York, and the secretary-treasurer, Dr. William M. Tuttle, 1151 Taylor Avenue, Detroit.

DONALD G. ANDERSON, M.D., *Secretary*.

## Medical Examinations and Licensure

### COMING EXAMINATIONS AND MEETINGS

#### EXAMINING BOARDS IN SPECIALTIES

**AMERICAN BOARD OF ANESTHESIOLOGY, INC.** *Oral.* Denver, Oct. 16-20. Sec., Dr. Curtiss B. Hickcox, 745 Fifth Ave., New York 27.

**AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY, INC.:** *Oral.* Cincinnati, Oct. 21-23. Sec., Dr. George M. Lewis, 66 East 66th St., New York 21.

**AMERICAN BOARD OF INTERNAL MEDICINE:** *Written.* Oct. 17. Asst. Sec.-Treas. Dr. W. A. Werrell, 1 Main St., Madison 3, Wis.

**AMERICAN BOARD OF NEUROLOGICAL SURGERY:** *Oral.* Chicago, June 3. Final date for filing applications is Jan. 1. Sec., Dr. W. J. German, 789 Howard Ave., New Haven.

**AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY, INC.** *Part I.* Various Centers. Feb. 3. Final date for filing application is Nov. 5. Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh.

**AMERICAN BOARD OF OPHTHALMOLOGY:** St. Louis, Oct. 15-19; Boston, April. Sec., Dr. Edwin B. Dunphy, 56 Ivie Rd., Cape Cottage, Maine.

**AMERICAN BOARD OF ORTHOPAEDIC SURGERY.** *Part II,* New York City, Feb. 9-10. Address: Sec.-Treas., Dr. Harold A. Sofield, Room 1856, 122 S. Michigan Ave., Chicago.

**AMERICAN BOARD OF OTOLARYNGOLOGY:** Chicago, Oct. 4-7. Sec., Dr. D. M. Lierle, University Hospitals, Iowa City.

**AMERICAN BOARD OF PATHOLOGY:** Chicago, Oct. 7-8. Sec., Dr. Robert A. Moore, 507 Euclid Ave., St. Louis.

**AMERICAN BOARD OF PEDIATRICS:** New York City, Oct. 21-23; Chicago, Dec. 9-11. Sec., Dr. John McK. Mitchell, 6 Cushman Road, Rosemont, Pa.

**AMERICAN BOARD OF PLASTIC SURGERY:** Examinations are given in June and November of each year in the home town of applicants. Sec.-Treas., Dr. Louis T. Byars, 400 Metropolitan Bldg., St. Louis, Mo.

**AMERICAN BOARD OF PREVENTIVE MEDICINE AND PUBLIC HEALTH:** *Parts I and II.* New York, Oct. 22-24. Sec., Dr. Ernest L. Stebbins, 615 N. Wolfe St., Baltimore.

**AMERICAN BOARD OF PROCTOLOGY:** November. Sec., Dr. Louis A. Buie, 102-110 Second Ave., S.W., Rochester, Minn.

**AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY, INC.** *Special Examination.* Chicago, Oct. 24-25. December, New York City. Sec., Dr. F. J. Braceland, 102-110 Second Ave., S.W., Rochester, Minn.

**AMERICAN BOARD OF RADIOLOGY:** *Oral.* Cincinnati, Sept. 28-Oct. 2. Sec., Dr. B. R. Kirklin, 102-110 Second Ave., S.W., Rochester, Minn.

**AMERICAN BOARD OF SURGERY:** *Written.* Various Centers, October 26. Sec., Dr. J. Stewart Rodman, 225 S. 15th St., Philadelphia.

**AMERICAN BOARD OF UROLOGY:** *Written.* December. *Oral and Clinical.* Chicago, Feb. 11-15. Sec., Dr. Harry Culver, 7935 Sunnyside Road, Minneapolis 18.

#### BOARDS OF MEDICAL EXAMINERS

**ALABAMA:** *Examination.* Montgomery, June 27-29. Sec., Dr. D. G. Gill, 519 Dexter Avenue, Montgomery.

**ARKANSAS:** * *Examination.* Little Rock, Nov. 3-4. Sec., Dr. Joe Verser, Harrisburg. *Eclectic.* Little Rock, Nov. 3. Sec., Dr. Clarence H. Young, 1415 Main St., Little Rock.

**COLORADO:** * *Endorsement.* Denver, Oct. 4. Sec., Dr. George H. Gillen, 831 Republic Building, Denver.

**CONNECTICUT:** * *Examination.* Hartford, Nov. 8-9. Secretary to the Board, Dr. Creighton Barker, 160 St. Ronan Street, New Haven.

**DELAWARE:** *Examination.* Dover, Jan. 10-12. *Reciprocity.* Dover, Jan. 19. Sec., Dr. J. S. McDaniel, 229 State Street, Dover.

**DISTRICT OF COLUMBIA:** * *Examination.* Washington, Nov. 14-15. Sec., Dr. G. C. Ruhland, 4130 E. Municipal Bldg., Washington.

**FLORIDA:** * *Examination.* Jacksonville, Nov. 27-29. Sec., Dr. Frank D. Gray, 12 N. Rosalind Ave., Orlando.

**GEORGIA:** *Examination.* Atlanta, Oct. 11-12. *Reciprocity.* Atlanta, Oct. 13. Sec., Mr. R. C. Coleman, 111 State Capitol, Atlanta 3.

**GUAM:** *Endorsement.* Agana, Last Friday of each month. Sec., Capt. C. K. Youngkin, Dept. of Public Health, Guam, % F.P.O., San Francisco.

**IDAHO:** Boise, Jan. 9. Exec. Sec., Mr. Armand L. Bird, 305 Sun Building, Boise.

**ILLINOIS:** Chicago, Oct. 4-6. Supt. of Registration, Mr. Fred W. Ruegg, Capitol Bldg., Springfield.

**INDIANA:** *Examination.* Indianapolis, June. Sec., Dr. Paul R. Tindall, 1138 K. of P. Bldg., Indianapolis.

**IOWA:** * *Examination.* Des Moines, Dec. 5-7. *Reciprocity.* Des Moines, Oct. 3, Nov. 7, Dec. 5. Sec., Dr. M. A. Royal, 506 Fleming Bldg., Des Moines.

**KANSAS:** Topeka, Dec. 8-9. Sec., Dr. J. F. Hassig, 905 N. Seventh St., Kansas City.

**MAINE:** Portland, Nov. 8-9. Sec., Dr. Adam P. Leighton, 192 State Street, Portland.

**MARYLAND:** *Examination.* Baltimore, Dec. 13-16. Sec., Dr. Lewis P. Gundry, 1215 Cathedral St., Baltimore. *Homeopathic Examination.* Baltimore, Dec. 13-14. Sec., Dr. John A. Evans, 612 West 40th St., Baltimore.

**MINNESOTA:** * Oct. 18-19. Sec., Dr. Julian F. Du Bois, 230 Lowry Medical Arts Bldg., St. Paul 2.

**MISSISSIPPI:** *Reciprocity.* Jackson, December. Sec., Dr. Felix J. Underwood, State Board of Health, Jackson 113.

**MISSOURI:** *Examination.* Jefferson City, October 24-26. *Reciprocity.* Jefferson City, October 23. Exec. Sec., Mr. John A. Hailey, State Capitol Building, Jefferson City.

**MONTANA:** Helena, Oct. 3-5. Sec., Dr. Otto G. Klein, First National Bank Bldg., Helena.

**NEVADA:** Carson City, Nov. 7. Sec., Dr. George H. Ross, 112 N. Curry St., Carson City.

**NEW JERSEY:** Oct. 18-21. Sec., Dr. E. S. Hallinger, 28 W. State St., Trenton.

**NEW MEXICO:** * Santa Fe, Oct. 10-11. Sec., Dr. Charles J. McGoey, Coronado Bldg., Santa Fe.

**NEW YORK:** *Examination.* New York, Albany, Syracuse and Buffalo, Oct. 4-7. Sec., Dr. Jacob L. Lechner Jr., 23 S. Pearl St., Albany 7.

**NORTH CAROLINA:** *Endorsement.* Asheville, Oct. 17. Sec., Dr. Ivan Proctor, 226 Hillsboro Street, Raleigh.

**OHIO:** *Examination.* Columbus, December. *Endorsement.* Oct. 2. Sec., Dr. H. M. Platter, 21 W. Broad St., Columbus.

**OREGON:** *Endorsement.* Portland, Nov. 4-9. Exec. Sec., Mr. Howard I. Bobbitt, 608 Failing Building, Portland.

**OKLAHOMA:** * *Examination.* Oklahoma City, June 7-8. Sec., Dr. Clinton Gallaher, 813 Braniff Building, Oklahoma City.

**PENNSYLVANIA:** *Examination.* Philadelphia or Harrisburg, January. Acting Sec., Mrs. Marguerite G. Steiner, 351 Education Building, Harrisburg.

**RHODE ISLAND:** * *Examination.* Providence, Oct. 6-7. Chief, Mr. Thomas B. Casey, 366 State Office Building, Providence.

**SOUTH CAROLINA:** *Examination.* Columbia, Nov. 8-9. *Reciprocity.* First Monday of every month. Sec., Dr. N. B. Heyward, 1329 Blanding St., Columbia.

**SOUTH DAKOTA:** * Sioux Falls, Jan. 17. Sec., Dr. C. E. Sherwood, 300 First National Bank Building, Sioux Falls.

**TENNESSEE:** * *Examination.* Memphis, Sept. 28-29. Sec., Dr. H. W. Qualls, 1635 Exchange Bldg., Memphis.

**VIRGINIA:** *Examination.* Richmond, Dec. 2-3. *Reciprocity.* Richmond, Dec. 1. Sec., Dr. K. D. Graves, 631 First St., S.W., Roanoke.

**WASHINGTON:** * Seattle, January. Director, Department of Licenses, Mr. Edward C. Dohm, Olympia.

**WEST VIRGINIA:** *Examination.* Charleston, Oct. 3-5. *Reciprocity.* Charleston, Oct. 3. Director, State Health Department, Dr. N. H. Dyer, Room 639, Capitol Building, Charleston.

**WISCONSIN:** * *Examination.* Madison, Jan. 10-12. Sec., Dr. C. A. Dawson, River Falls.

**WYOMING:** Cheyenne, Oct. 3. Sec., Dr. Franklin D. Yoder, Capitol Bldg., Cheyenne.

* Basic Science Certificate required.

#### BOARDS OF EXAMINERS IN THE BASIC SCIENCES

**ARIZONA:** *Examination.* Tucson, Sept. 20. Sec., Mr. Francis A. Roy, Science Hall, University of Arizona, Tucson.

**ARKANSAS:** *Examination.* Little Rock, Oct. 4. Sec., Mr. L. E. Gebauer, 1002 Donaghey Bldg., Little Rock.

**CONNECTICUT:** New Haven, Oct. 8. Executive Assistant, State Board of Healing Arts, Miss Mary G. Reynolds, 110 Whitney Ave., New Haven 10.

**DISTRICT OF COLUMBIA:** Washington, Oct. 24-25. Sec., Dr. G. C. Ruhland, 4130 E. Municipal Bldg., Washington.

**FLORIDA:** *Examination.* Gainesville, Nov. 3. Sec., Mr. M. W. Emmel, University of Florida, Gainesville.

**MICHIGAN:** *Examination.* Detroit and Ann Arbor, Oct. 14-15. Sec., Miss Eloise LeBeau, 101 N. Walnut St., Lansing 13.

**MINNESOTA:** *Examination.* Minneapolis, Oct. 4-5. Sec., Dr. Raymond N. Bieter, 105 Millard Hall, University of Minnesota, Minneapolis.

**NEBRASKA:** *Examination.* Omaha, Oct. 4-5. Director, Bureau of Examining Boards, Mr. Oscar F. Humble, Room 1009, State Capitol Bldg., Lincoln 9.

**OKLAHOMA:** *Examination.* Oklahoma City, April 11. Sec., Dr. Clinton Gallaher, 813 Braniff Building, Oklahoma City.

**OREGON:** Portland, Dec. 3. Sec., Mr. Charles D. Byrne, State Board of Higher Education, Eugene.

**SOUTH DAKOTA:** Vermillion, Dec. 2-3. Sec., Dr. Gregg M. Evans, 310 E. 18th St., Yankton.

**WASHINGTON:** Seattle, January. Director, Department of Licenses, Mr. Edward C. Dohm, Olympia.

**WISCONSIN:** Milwaukee, Sept. 24 and Dec 3. Sec., Prof. W. H. Barber, Ripon College, Ripon.

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# Current Medical Literature

## AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1938 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

### American Journal of Medicine, New York

**6**:275-404 (March) 1949

Correlation of Liver Function and Liver Structure: Clinical Applications. H. Popper, F. Steigmann, K. A. Meyer and others.—p. 278.
*Correlation of Hepatic Structure and Function. L. W. Kinsell, H. A. Weiss, G. D. Michaels and others.—p. 292.
*Treatment of Hepatic Amebiasis with Chloroquine. N. J. Conan Jr. —p. 309.
Liver Function During Infectious Mononucleosis. J. W. Brown, J. L. Sims, E. White and J. E. Clifford.—p. 321.
Endocrinopathies Associated with Hyperostosis Frontalis Interna. F. E. Harding.—p. 329.
Subacute Bacterial Endocarditis. R. Snyderman and J. S. Tipping. —p. 336.
Epidemiology of Syphilis. T. J. Bauer and A. P. Iskrant.—p. 341.

**Correlation of Hepatic Structure and Function.**—Clinical, chemical and histologic follow-up studies have been made by Kinsell and collaborators over long periods in a large group of patients with acute, subacute and chronic hepatic disease. For this report, 3 acute, 1 subacute and 5 chronic cases were selected from a larger group as being most representative. From a study of liver biopsy sections and results of tests of chemical function, only rather gross information can be obtained about the activity, extent and duration of the process causing damage to the liver. Activity is correlated histologically with phagocytic cell infiltration and with hepatocellular change as manifested by widespread multinucleation, abnormalities of cell shape and size and abnormalities of staining characteristics. Activity is indicated by abnormal results of cephalin-cholesterol flocculation and thymol turbidity tests as well as elevation of the serum bilirubin and/or icterus index. Extent and duration of the hepatotoxic process are manifested histologically by hepatocellular change and by fibrosis. The chemical changes which are found in liver damage of widespread extent and/or long duration are abnormal sulfobromophthalein retention, diminished hepatic glycogen storage and elevation of the serum bilirubin and/or icterus index. The authors feel that there are still many gaps in the knowledge of the histologic and physiologic aspects of the liver and that when such additional knowledge is obtained revision of the present archaic classification of hepatic disease will be in order. An approach to such a reclassification is presented.

**Treatment of Hepatic Amebiasis with Chloroquine.**—According to Conan the wartime antimalarial drug research program disclosed a number of highly active compounds of the 4-amino-quinoline series. It seemed logical to determine whether their antiplasmodial activity extended to other pathogenic protozoa. The infection selected for study was that with Endameba histolytica, because of its relative prevalence among protozoal infections in the New York area. Of the various 4-amino-quinoline derivatives tested for antimalarial activity, the greatest amount of information was available concerning chloroquine, which is 7-chloro-4-(4-diethylamino-1-methylbutylamino) quinoline, and which had proved to be one of the more active and less toxic members of the series. The author used chloroquine successfully in 7 patients with amebic hepatitis. Chloroquine is a safe and effective chemotherapeutic agent for the treatment of amebic infections of the liver, being at least as effective as emetine hydrochloride but without the latter's toxicity. The combination of chloroquine with a superior intestinal antiamebic drug should permit adequate treatment of any amebic infection and should permit wider use of antiamebic chemotherapy as a diagnostic and therapeutic test in obscure infections of the liver and intestine.

### Bulletin of the Los Angeles Neurological Society

**14**:1-52 (March) 1949

Analysis of Electroencephalographic Findings in 40 Cases of Verified Brain Tumor: I. Electroencephalographic Findings in Meningiomas. H. M. Cuneo, C. W. Rand and H. Sjaardema.—p. 1.
*Intravenous Procaine Hydrochloride in Treatment of Asphyxia Due to Carbon Monoxide: Report of 3 Treated Cases and 2 Untreated Cases with Electroencephalographic Correlation. C. W. Olsen, A. A. Marinacci, J. W. Ray and E. W. Amyes.—p. 23.
Unilateral Prefrontal Lobotomy for Relief of Intractable Pain: Preliminary Report of 8 Cases. P. J. Vogel and G. D. Hjartarson. —p. 32.
Glomus Tumors (Angioneuromyomas): Clinical and Pathologic Report of Case. D. L. Reeves.—p. 40.
Epilepsy Incident to Protoplasmic Astrocytoma: Report of Case. G. N. Thompson and R. Raney.—p. 46.

**Intravenous Procaine Hydrochloride in Asphyxia Due to Carbon Monoxide.**—Most cases of carbon monoxide poisoning terminate either in death or in recovery without residual ill effects. With the rescue of victims from near fatality, survival with more or less serious residual effects is increasingly common. Pneumonia, disorders of the heart, gangrene of the extremities and pressure sores are reported from time to time. The authors discuss residuals in the nervous system. Courville summarizes the pathologic findings in the central nervous system as hyperemia and edema of the brain, hemorrhages of various sizes in the globus pallidus, gross softening of the globus pallidus due to acute necrosis, calcareous deposits in the small blood vessels, cyst formation and vascular scars with calcareous deposits. The clinical syndromes in survivors include protracted coma, psychosis, parkinsonism, polyneuritis, blindness and asthenic states. Painful spasms of skeletal muscles are especially characteristic during the early phase of recovery. Olsen and co-workers attempted to repeat the reported beneficial effects of intravenous injections of procaine hydrochloride in carbon monoxide poisoning. Cases were selected in which recovery was incomplete, and particularly those in which the residual symptoms could be correlated with cerebral dysrhythmia as shown in electroencephalograms. The authors report 3 cases in which procaine hydrochloride was given. The prompt restoration suggests that procaine influences the circulation favorably, with commensurate improvement in the wave pattern. In the state of dehydration accompanying carbon monoxide poisoning there is a good deal to be gained by intravenous administration of isotonic sodium chloride solution, and procaine hydrochloride can be administered simultaneously in the 0.1 per cent concentration. This method of administration, as well as the more convenient method of administration by syringe injection, of as much as 10 cc. of 1 per cent solution, seems to have contributed to the early recovery of the patients. The consistency of correlation between the clinical symptoms and the electroencephalographic findings, even in patients who made rapid recovery, is a remarkable feature of this study.

### Bulletin New York Academy of Medicine, New York

**25**:135-196 (March) 1949

New Analgesic Drugs. H. B. van Dyke.—p. 152.
Early Ambulation Following Surgical Procedures. J. B. Blodgett. —p. 176.
Principles of Nutrition Therapy. R. S. Goodhart.—p. 185.

**25**:199-268 (April) 1949

Management of Acute Renal Failure. I. Snapper.—p. 199.
Place of Electrolyte Studies in Surgical Patients. J. S. Lockwood and H. T. Randall.—p. 228.

### Georgia Medical Association Journal, Atlanta

**38**:89-130 (March) 1949

Propionic Acid in Therapy of Mycotic Vulvovaginitis: Method of Diagnosis. R. R. Suran and R. B. Greenblatt.—p. 89.
Simple Stain for Trichomonads and Vaginal Epithelia. R. B. Greenblatt.—p. 95.
Is Cholesterol Metabolism Getting Enough Attention in Early Coronary Disease? W. W. Blackman and J. M. Walton.—p. 96.
Fallacy of Basal Metabolic Rate. J. K. Fancher.—p. 98.
Rocky Mountain Spotted Fever. H. M. Reynolds and Helen W. Bellhouse.—p. 101.
Nasal Reconstruction: Report of Case. J. R. Lewis Jr.—p. 104.
Government Medicine in New Zealand—It's Social, Economical, and Political Implications. A. L. Jones.—p. 106.
Cancer News. J. C. Norris.—p. 112.
Voluntary Prepayment Medical Plans Gaining in Public Favor. E. H. Greene.—p. 113.

## Journal of Nervous and Mental Disease, New York

**109**:201-290 (March) 1949

Some Observations on Lobotomized Patients Based upon Routine Neurologic Examinations. A. S. Rose.—p. 201.
Experimental Production of Convulsive Seizures. C. L. Anderson. —p. 210.
Verified Cerebral Aneurysm with Negative Arteriogram. B. J. Alpers and J. J. Ryan.—p. 220.
Oculokinetic Test of Equilibratory Co-ordination Having Differential Diagnostic Use. R. Meyers.—p. 226.
Inducing Anxiety as Part of Therapeutic Method. E. F. Walker. —p. 233.
Allergy and Psychoneuroses. F. C. Metzger.—p. 240.
Wechsler-Bellevue Scale and Substitution Test as Aid in Neuropsychiatric Diagnosis: Part 2. Louise R. Hewson.—p. 246.

## New England Journal of Medicine, Boston

**240**:403-444 (March 17) 1949

Prothrombin: Critique of Methods for Its Determination and Their Clinical Significance. B. Alexander, A. de Vries and R. Goldstein. —p. 403.
Partial Uretheral Obstruction: Its Effect on Urinary Excretion. G. J. Warren and J. M. Looney.—p. 413.
Mumps Complicated by Myocarditis, Meningoencephalitis and Pancreatitis: Review of Literature and Report of Case. J. H. Bland. —p. 417.
Left Vocal-Cord Paralysis Associated with Hypertensive Heart Disease. W. C. L. Diefenbach.—p. 419.
Torsion of Normal Fallopian Tube Complicating Pregnancy: Report of Case. R. K. Caldwell.—p. 421.
Syphilis. G. M. Crawford.—p. 422.
Benign Cystic Teratoma of Kidney.—p. 432.
Bronchial Adenoma.—p. 435.

## New York State Journal of Medicine, New York

**49**:577-688 (March 15) 1949

Experiences with Retropubic Prostatectomy. F. A. Beneventi and F. P. Twinem.—p. 623.
Hormone Control Therapy as Preparation for Radical Perineal Prostatectomy in Advanced Carcinoma of Prostate. A. L. Parlow and W. W. Scott.—p. 629.
Experimental Approach to Psychosomatic Bladder Disorders. L. R. Straub, H. S. Ripley and S. Wolf.—p. 635.
Control of Tubercle Bacillus by Synergistic Treatment. G. E. Slotkin and W. Spencer.—p. 639.
Tonus of Upper Urinary Tract and Its Influence on Renal Dynamics and Absorption. P. A. Narath.—p. 645.
Wilms' Tumor. C. T. Hazzard, M. M. Melicow and R. F. Seidel. —p. 649.
Effect of Ingestion of Aluminum Hydroxide on Serum Salicylate Level. R. Wegria, D. Weaver and H. Krakauer.—p. 658.
Lability Test: New Procedure for Diagnosis of Chronic Simple Glaucoma. S. Bloomfield.—p. 659.
Rhinologic Use of Oxidized Cellulose Gauze. E. J. Elsbach.—p. 663.

## Pediatrics, Springfield, Ill.

**3**:277-400 (March) 1949

*Mode of Action of Streptomycin on H. Influenzae Type B. III. Nature of Streptomycin Action on Sensitive H. Influenzae. Hattie E. Alexander and Grace Leidy.—p. 277.
Congenital Chondrosternal Prominence (Pigeon Breast), a New Interpretation. H. A. Brodkin.—p. 286.
Generalized Non-Fatal Histoplasmosis in Infant. R. W. Blumberg, I. Ruckman and R. J. Johansmann.—p. 296.
*Encephalitis: Isolation and Identification of Virus from Body Fluids of Human Subjects. R. J. Blattner and Florence M. Heys.—p. 303.
Cyanosis in Infants with Nitrates in Drinking Water as Cause. W. E. Donahoe.—p. 308.
Pediatric Aspects of Hemophilia. A. J. Quick.—p. 312.
Immunohematologic Observations on Erythroblastotic Infants. I. Diagnosis and Prognosis. P. Sturgeon.—p. 318.
Successful Removal of Hemangioma of Liver in Infant. T. Shuller, J. L. Rosenzweig and J. B. Arey.—p. 328.
Combined Immunization Against Diphtheria, Tetanus and Pertussis in Newborn Infants. III. Relationship of Age to Antibody Production. P. A. di Sant'Agnese.—p. 333.
Pure Granulomatous Nocardiosis: New Form of Disseminated Infectious Granulomatosis with Massive Retroperitoneal Lymphadenopathy Due to Nocardia Intracellularis (n. sp.). M. L. Weil, J. T. Cuttino and Anne M. McCabe.—p. 345.

**Action of Streptomycin on Haemophilus Influenzae.**—Alexander and Leidy inoculated pour plate preparations of Levinthal agar containing various concentrations of streptomycin with differently sized bacterial populations of three strains of Haemophilus influenzae type B. The bacteria were exposed to the action of streptomycin for varying periods. Results demonstrated that members of H. influenzae type B populations are not uniformly sensitive to streptomycin. Over 99 per cent are susceptible to 1.6 microgram per cubic centimeter; the larger the population, the wider the variation in resistance of the small fraction surviving. The injurious action of streptomycin on H. influenzae type B is primarily bactericidal. Streptomycin in concentrations between 10 and 100 micrograms per cubic centimeter exerts a rapid lethal action; the greater the concentration of the antibiotic, the greater the speed. Significant increases in size of population increase the time required for bactericidal action. Demonstration of the rapid in vitro bactericidal action of streptomycin on H. influenzae together with the data presented concerning the sterilization of the spinal fluid of patients after the administration of streptomycin suggest that when streptomycin is used in the treatment of H. influenzae infection in man its intramuscular administration over a period not longer than twenty-four hours will ordinarily suffice to obtain a maximal streptomycin effect, that in cases of meningitis the addition of a single intrathecal dose of streptomycin of 25 mg. will be adequate and that the use of sulfadiazine as an adjuvant is advisable to bring under control the eventual resistant mutants which may survive the bactericidal action of streptomycin.

**Isolation and Identification of Encephalitis Virus.**—Blattner and Heys inoculated the heparinized blood of 81 patients showing signs of clinical encephalitis into mice and into the retracted chorioallantois of embryonated hen's eggs in attempting isolation of virus from the blood. A filtrable virus was isolated in 1 instance only, namely, from the peripheral blood of a boy aged 8 seen at St. Louis Children's Hospital during July 1945. The infectious agent was identified by appropriate tests as the virus of St. Louis encephalitis. No virus was isolated from the spinal fluid of this patient. A series of 304 patients was studied for the presence of virus in the spinal fluid; a virus was recovered in 7 cases. Five strains of lymphocytic choriomeningitis virus were isolated, four of them in children between the ages of 6 and 14 years and one in a young adult. In 1 case of encephalitis following smallpox vaccination in an infant of 9 months a strain of vaccinia was recovered from blood-tinged spinal fluid taken on the thirteenth day following vaccination. A strain of herpes virus (simplex) was isolated from the spinal fluid of a boy aged 14. The results reported cover a period of about ten years. A third series of studies concerned blood serums. Increasing titer of type-specific antibody to the virus of St. Louis encephalitis was demonstrated in 17 of 152 patients during the course of clinical encephalitis.

## Southern Surgeon, Atlanta, Ga.

**15**:151-204 (March) 1949

Metycaine Saddle Block Analgesia in Obstetrics. H. B. Turner.—p. 151.
Congenital Anomalies of Gastrointestinal Tract in Infants and Children. G. H. Martin.—p. 163.
Treatment of Bilateral Apical Pulmonary Tuberculosis. D. A. Wilson. —p. 179.

## Texas State Journal of Medicine, Fort Worth

**45**:119-182 (March) 1949

Etiology and Treatment of Optic Neuritis. W. L. Benedict.—p. 126.
Senile Cataract Patient: Pattern for Surgical Management. R. K. Daily and L. Daily Jr.—p. 130.
Prevention and Treatment of Complications in Cataract Surgery. E. L. Goar.—p. 136.
Treatment of Glaucoma. L. H. Quinn.—p. 142.
Orthoptics Without Instruments. S. N. Key Jr.—p. 146.
Chronic Paranasal Sinus Disease in Adults: Factors Influencing Treatment. J. P. Gill.—p. 149.
Irradiation of Nasopharynx. A. N. Champion.—p. 153.
Roentgenologic Study of Colon: Value of Double Contrast Enema. R. D. Moreton and C. W. Yates.—p. 157.

## Western J. Surg., Obst. & Gynecology, Portland, Ore.

**57**:99-142 (March) 1949

Safe Method of Exsanguination Transfusion in Treatment of Erythroblastosis Fetalis: Report of 7 Cases. A. M. Boyden.—p. 99.
Vesical Endometriosis: Report of 2 Cases. T. G. McDougall and S. J. Deur.—p. 107.
Schubert Operation for Congenital Aplasia of Vagina with Report of 2 Cases. J. L. Bubis.—p. 113.
Term Pregnancy Complicated by Ruptured Appendix with Generalized Peritonitis. M. G. Potter and M. G. Sadugor.—p. 120.
Postural Pains of Pregnancy: Part I—Parietal Neuralgia of Pregnancy. L. F. Bushnell.—p. 123.
Vicarious Menstruation: Resume of Literature and Report of Case. H. S. Stern.—p. 128.
Tumors of Renal Pelvis and Their Management. P. B. Potampa and C. W. Calhoun.—p. 130.

## FOREIGN

An asterisk (*) before a title indicates that the article is abstracted. Single case reports and trials of new drugs are usually omitted.

### British Medical Journal, London

**1**:557-602 (April 2) 1949

Whither Medicine. Lord Horder.—p. 557.
Venous Thrombosis and Anticoagulants. K. P. Ball and H. O. Hughes. —p. 560.
Diabetic Coma: Treatment With and Without Early Administration of Glucose. J. Lee, D. Naidoo and J. A. Torrens.—p. 565.
*Subacute Pancreatitis. I. Macnab.—p. 568.
Report on Outbreak of Influenza in the Army. D. G. Milne and J. D. Cruickshank.—p. 571.
Spontaneous Intra-Abdominal Hemorrhage. A. L. Woolf and H. R. Thomson.—p. 572.
Effect of Pressure Cooking on Vitamin C Content of Vegetables. G. M. Chappell and A. M. Hamilton.—p. 574.
Spermatolysis: Cause of Male Sterility. C. Yildiran.—p. 575.

**Subacute Pancreatitis.**—According to Macnab subacute pancreatitis is not as widely recognized as the acute hemorrhagic form and the chronic types of the disease. Subacute pancreatitis is a fairly rapidly developing inflammation of the pancreas, generally associated with much edema, which does not produce the same urgent clinical picture as the hemorrhagic form. There is a tendency to recurrence, and the initial attack is generally followed by several similar attacks over a period of time, producing the syndrome of recurrent pancreatitis. During one year at the General Hospital, Birmingham, there were 19 cases of subacute pancreatitis. The author presents tables summarizing the clinical findings in 6 patients with an initial attack of subacute pancreatitis and in 13 patients with a recurrent attack of subacute pancreatitis. The possibility of subacute pancreatitis must always be borne in mind in the diagnosis of an abdominal emergency, especially acute cholecystitis. Confusion of the condition with cholecystitis accounts for many of the cases of recurrence of symptoms following cholecystectomy. This error in diagnosis would largely be obviated if serum-amylase investigations were more often employed in elucidating obscure upper abdominal pain. Subacute pancreatitis is not a rare condition, and its diagnosis depends largely on one's being aware of the existence of this clinical syndrome.

### Journal of Obst. & Gynaec. of Brit. Empire, Manchester

**55**:1-180 (Feb.) 1949. **Partial Index**

Pathology and Repair of Genital Prolapse. K. Pacey.—p. 1.
Natural Childbirth in Teaching Clinic. H. Thoma.—p. 18.
Review of Series of 100 Cases of Vesicovaginal Fistula. R. G. Krishnan.—p. 22.
*Anemia Simulating Pre-Eclamptic Toxemia. J. M. Scott and A. D. T. Govan.—p. 28.
Measurement of Rate of Venous Blood-Flow in Legs of Women at Term and in Puerperium, Using Radioactive Sodium. H. P. Wright and D. G. Edmonds.—p. 36.
Treatment of Carcinoma of Body of Uterus. B. Rickford.—p. 41.
*Pulmonary Embolism by Amniotic Fluid: Report of Fatal Case, Together with Review of Literature. D. M. Shotton and C. W. Taylor.—p. 46.
Morphine Mocate in Labor and Obstetric Practice: Preliminary Communication of Results in Series of 170 Injections. W. F. Flint.—p. 54.
Locked Twins: Report of 3 Cases. R. F. Lawrence.—p. 58.
Pasini's Strain for Vaginal Smears. W. S. Bullough.—p. 64.
Contribution to Historical Record of Monstrous Births. J. F. D. Shrewsbury.—p. 67.
Observations on Aftercoming Head. J. Baxter.—p. 95.
Chronic Lymphatic Leukemia Presenting as Neoplasm of Cervix Uteri. L. Stein.—p. 107.

**Anemia Simulating Preeclamptic Toxemia.**—Scott and Govan report observations in 13 cases of anemia simulating preeclamptic toxemia. The chief symtoms were edema, hypertension and albuminuria. The general symptoms and signs commonly associated with anemia were absent in all but 4 cases. The syndrome can be distinguished from that of true toxemia by careful examination of the blood pressure, urine and blood picture. The increase in blood pressure is mainly on the systolic side, and there is a consequent increase in the pulse pressure. The blood pressure usually falls to normal limits within twenty-four or forty-eight hours of the patient's admission to the hospital. The edema is much severer in these cases of anemia in relation to the hypertension than in preeclamptic toxemia, and the extent of the edema appears to vary directly with the severity of the anemia. Despite the gross edema, albuminuria is of slight degree and the urine rapidly clears with rest in bed. Untreated asymptomatic patients rapidly became symptomatic in the puerperium, generally about the third day. The sudden appearance of symtoms in these cases may afford an explanation for reports of cases of puerperal pernicious anemia of sudden onset. Examination of the peripheral blood and bone marrow has shown that these are cases of atypical pernicious anemia of pregnancy. The peripheral blood picture is that of an ordinary iron deficiency anemia, but the bone marrow contains megaloblasts and the normoblasts are greatly reduced. Iron therapy rectifies the iron deficiency, but the blood picture improves only to a certain limit and liver therapy has to be provided.

**Pulmonary Embolism by Amniotic Fluid.**—Shotton and Taylor report a sudden death during labor due to pulmonary embolism by amniotic fluid; 14 other recorded cases are cited. This condition is a clinical entity in which the patient is usually a healthy multigravida with a large, perhaps postmature, fetus. Labor is violent, and the baby is often stillborn. During labor, or shortly after delivery, there is a sudden onset of profound shock, with cyanosis and dyspnea, terminating fatally in a few hours. At necropsy there is usually no obvious cause of death, but microscopic examination of the lungs shows emboli, consisting of the particulate contents of the amniotic fluid, in the smaller pulmonary vessels. The possibility of a sublethal type of embolism raises the question of treatment. Steiner and Lushbaugh point out that the condition is aggravated by reflex spasm in the lungs and cardiac depression. The administration of atropine to dogs before injection of the amniotic fluid lessened the severity of the reaction, presumably by abolishing depressor reflexes from the lung to the heart. On this evidence they advocate treatment with large doses of morphine and atropine, together with oxygen inhalation. Treatment of the shock with intravenous fluids is contraindicated because of the pulmonary edema.

### Lancet, London

**1**:553-592 (April 2) 1949

Role and Value of Anamnesis. A. Abrahams.—p. 553.
Retinal and Vascular Damage in Long-Standing Diabetes. J. H. Croom and G. I. Scott.—p. 555.
Deaths from Vagal Inhibition. K. Simpson.—p. 558.
*Adrenolytic Action of Dihydroergocornine in Man. R. H. Goetz and A. Katz.—p. 560.
Reablement of Tuberculous Patients. R. Grenville-Mathers.—p. 563.
Cretinism with Goitre in Infancy: 2 Cases Treated with Thyroid. V. Smallpeice.—p. 565.

**Adrenolytic Action of Dihydroergocornine.**—According to Goetz and Katz dihydroergocornine, also known as D.H.O. 180, is adrenolytic as well as sympathicolytic, an action which has never before been demonstrated in man for any ergot derivative. In the experiments described, the blood pressure, peripheral blood flow, heart rate, respirations and skin temperature were recorded. Epinephrine, 1:500,000, was given at a desired and constant rate by intravenous drip. The investigations were made of 2 normal persons and 3 uncomplicated cases of essential hypertension—i.e., cases in which there was no evidence of congestive heart failure, myocardial damage, disease of the kidneys or the fundi or any other condition to which the hypertension could have been secondary. Dihydroergocornine, besides being sympathicolytic, suppresses and reverses the pressor response to epinephrine in man. It does not abolish the cardioaccelerator effect of epinephrine. The vasoconstrictor effect of epinephrine on the digital circulation is not affected by dihydroergocornine given in doses sufficient to suppress or reverse the effect on the blood pressure. The stimulating effect of epinephrine on the respiratory center (direct or indirect) is not abolished by doses of dihydroergocornine sufficiently to reverse or suppress the pressor response. The respiratory depression produced by dihydroergocornine is abolished and respiration is regular while epinephrine is administered. Dihydroergocornine apparently does not promote the destruction of epinephrine either in vitro or in vivo. The possible clinical usefulness of dihydroergocornine is indicated.

## Acta Tuberculosea Belgica, Brussels

**60**:1-80 (Feb.) 1949

Problems of Tuberculosis in the Negroes of Belgian Congo in 1948. J. Firket.—p. 1.
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# Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

## AUREOMYCIN IN BRUCELLOSIS

**To the *Editor*:—Does aureomycin afford the best means of treating chronic, low grade undulant fever showing positive skin reaction and agglutination for Brucella abortus?**
**M.D., California.**

ANSWER.—The immediate results with aureomycin in bacteriologically proved cases of brucellosis have been more satisfactory than with other forms of available specific therapy. "Low grade undulant fever" has come to mean ill defined symptoms that may mimic neurasthenia, anxiety state or psychoneurosis. In these circumstances chronic brucellosis cannot be differentiated from psychosomatic dysfunction. A positive reaction to a skin test and agglutinins for Brucella not only may be associated with active disease but are also found in persons who have been exposed to brucellosis in the past and have recovered. It thus becomes extremely difficult to evaluate specific therapy in an illness of doubtful causation. Therefore, even if aureomycin is tried in these cases, the results are of questionable significance. As with other infectious diseases, accurate and dependable data on specific therapy can be obtained only with bacteriologically proved cases. On this basis, aureomycin is the most satisfactory agent available for acute and chronic brucellosis due to any one of the three species of Brucella.

## ABSORPTION OF NICOTINE

**To the *Editor*:—Can nicotine saturation of the body be determined?**
**Marvin Smith, M.D., Miami, Fla.**

ANSWER.—Nicotine saturation of the body is a somewhat misleading expression. The body will continue to absorb nicotine to the point of fatality. The nicotine content of body fluids and tissues was determined in most of the older studies by bioassay technics which may be made specific but are usually not precise. Recent studies by the use of cyanogen bromide technics are more precise and may detect as little as 1 microgram of the alkaloid. This method utilizes the Beckman spectrophotometer and requires expert chemical performance.

After smoking, only a few micrograms of nicotine per cubic centimeter may be found in the blood. Somewhat higher concentrations of nicotine together with derivatives of nicotine are reported in the urine. Traces have also been described in the milk and other secretions.

## FLUORIDE IN DRINKING WATER

**To the *Editor*:—I am planning on putting sodium fluoride in drinking water for use of children. How much should I put in to give proper protection and to avoid danger of mottling of the teeth?**
**R. Y. Treadwell, M.D., San Luis Obispo, Calif.**

ANSWER.—It should be remembered that sodium fluoride is a poison; and even when the drinking water contains as little as 2 parts per million of fluoride (F), it may cause "mottling" of the teeth. The minimal threshold for dental fluorosis is 1 part per million of fluoride. Since the fluoride concentration must be adjusted carefully and it is comparatively difficult to do this when operating on a small scale, it is not advisable to attempt it. If a fluoride supplement is to be given, it should be under strict medical supervision and preferably to be prescribed in the form of tablets prepared by a reputable pharmaceutical house.

## MOTION SICKNESS

**To the *Editor*:—Is there any treatment for car sickness (automobile)? A patient, a 15 year old boy, who has to come to my office from a distant city each week is unable to get relief from this ailment.**
**William J. MacDonald, M.D., Boston.**

ANSWER.—Sea sickness, car sickness and motion sickness are usually initiated from the internal ear, the eyes or the memory of past experience. Keeping the eyes closed and the stomach empty may in some persons aid toward prevention. Numerous drugs, such as "Mother Sill's Sea-Sick Remedy," have been advocated and tried for this temporary but distressing illness. Most of these remedies contain barbiturates or belladonna-like drugs. The United States Army Medical Department has recently announced the development of a new drug, dramamine,* (beta-dimethylaminoethyl benzohydryl ether 8-chlorotheophyllinate) that acts as both a cure and preventive of seasickness or motion sickness. The original research was done by Dr. Leslie N. Gay, of the Protein Clinic of Johns Hopkins University Hospital, Baltimore, and Dr. Paul Carliner, also of Johns Hopkins. Recent experiments showed almost total cure or prevention of seasickness among more than 400 passengers aboard an Army transport in heavy seas.

## LIVER EXTRACT IN MULTIPLE SCLEROSIS

**To the *Editor*:—Would you please list, if any, the deleterious effects of intensive and prolonged therapy with intramuscular liver extract. The patient, 32 years of age, with multiple sclerosis, has been receiving, biweekly, intramuscular injections of a concentrated liver extract solution containing 15 U.S.P. units per dose. Treatment has been constantly maintained for seven months. Are such large doses indicated or necessary for maintaining general nutrition in such a case? Would they in any manner tend to encourage the deposition of calcium in bursae, resulting in acute calcific bursitis?**
**M.D., Pennsylvania.**

ANSWER.—There has been no clinical evidence found to date that intramuscular injections of liver extract causes or encourages the production or deposition of calcium. Your patient has received only fourteen injections thus far (one every two weeks). Liver was given in multiple sclerosis originally by Goodall and Slater (*Edinburgh M. J.* 43:368, 1936) because they felt that disseminated sclerosis is a deficiency disease. Your patient should be asked to eat ½ pound of liver three times per week as well as eggs, milk, fresh vegetables and fruit. This should be sufficient to maintain good nutrition. The liver extract is injected only because the patient cannot or will not eat liver.

## HAZARDS OF BUTANE GAS

**To the *Editor*:—Is there any menace to health in the domestic use of butane gas?**
**M.D., North Carolina.**

ANSWER.—Butane gas in high concentration is a mild anesthetic, but chiefly is a simple asphyxiant of importance only as it replaces oxygen in the atmosphere. Obviously some danger from explosion and fire exists, but the real practical danger derives from the ready formation of carbon monoxide in the presence of incomplete combustion. All gas stoves should be vented and many fuel gases, including butane, should contain odorous warning agents. Cylinders of butane should not be located inside a dwelling but on the outside. Liquid butane if emitted in spurts from cylinders or gas line leaks may bring about immediate freezing with extensive tissue damage. Sensitization to butane has been reported, but this is subject to question. In general, the nontoxic properties of this gas are reflected in the statement that concentrations from 3 to 5 per cent may be breathed for long periods and for repeated periods without prospect of injury.

## TYPHOID TREATMENT IN IRITIS

**To the *Editor*:—Are typhoid inoculations of any value in the treatment of iritis?**
**Edward J. Gross, M.D., Grand Rapids, Mich.**

ANSWER.—Typhoid injections frequently bring an acute attack of iritis to a prompt cessation but leave the causative factor unaffected, with the good possibility that the iritis will soon recur. When attacks recur it is important, though sometimes tedious and difficult, to locate and eradicate the cause. Causes include syphilis, tuberculosis, gonorrhea and so-called closed focal infections of the teeth, tonsils, sinuses, gallbladder and appendix.

## BANTI SYNDROME

**To the *Editor*:—A woman aged 46 died of Banti's disease twenty years ago. Recently her son, aged 32, died of the same disease. Is this a familial disease?**
**Angus A. Campbell, M.D., Toronto, Canada.**

ANSWER.—The Banti syndrome has been noted in parents and children, but the occurrence is apparently rare. As the syndrome may result from a number of different causes, the presence of the symptoms in two members of a family need not be on a hereditary or familial basis.